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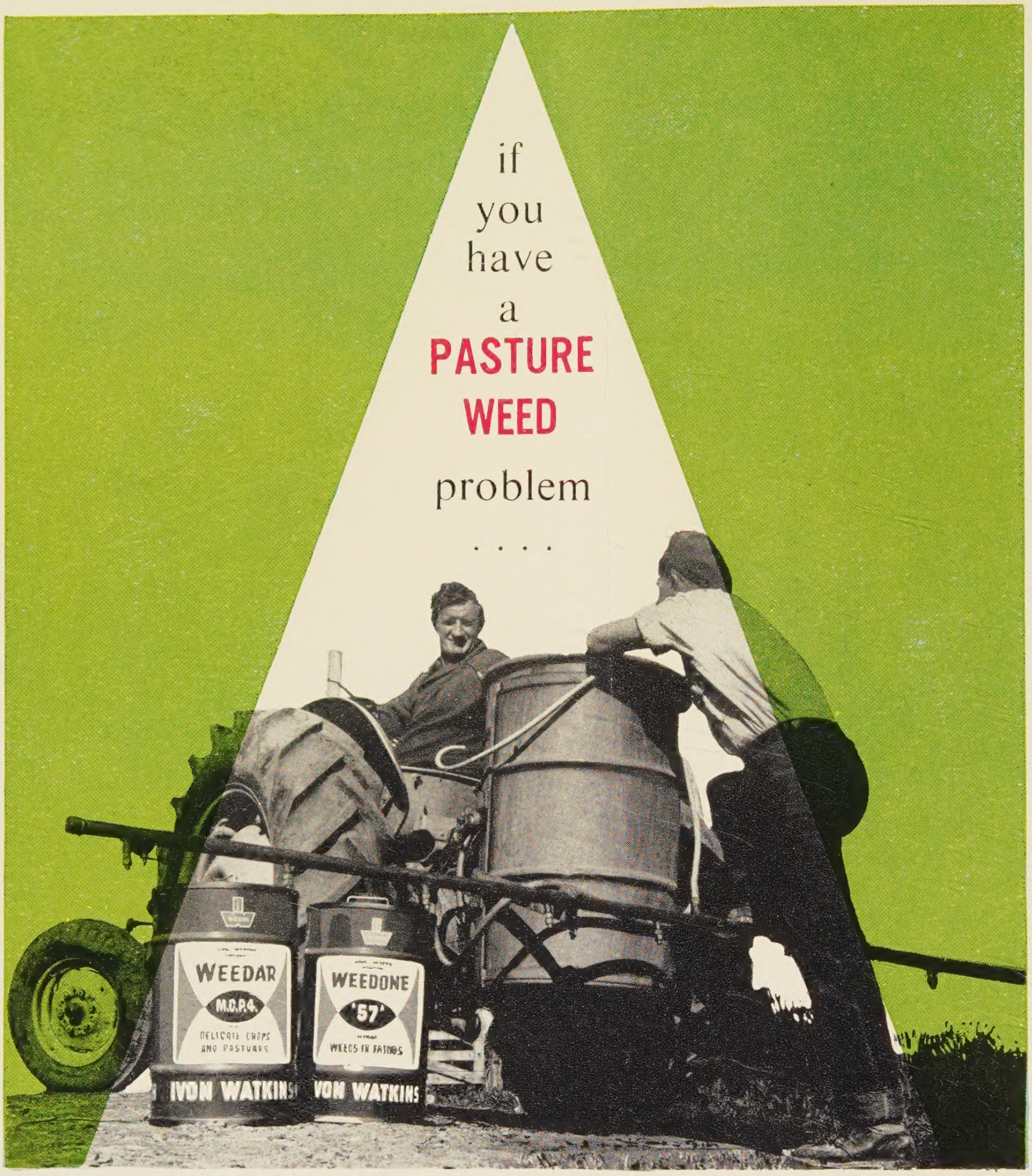
NEW ZEALAND
JOURNAL OF

AGRICULTURE

MAY
1961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NEW ZEALAND
Journal of Agriculture

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Cover

Harvesting of tobacco in the Motueka district begins in late January and continues until the end of April. Mobile picking platforms such as that shown speed up picking and make the work more pleasant. The leaf is picked by hand, the pickers being on seats at the level of the crop. Picked leaves are carried up to the higher level on endless chains. On the top platform the leaves are tied together and then tied on to sticks ready for loading into the drying kiln.

[*D. G. Jardine*

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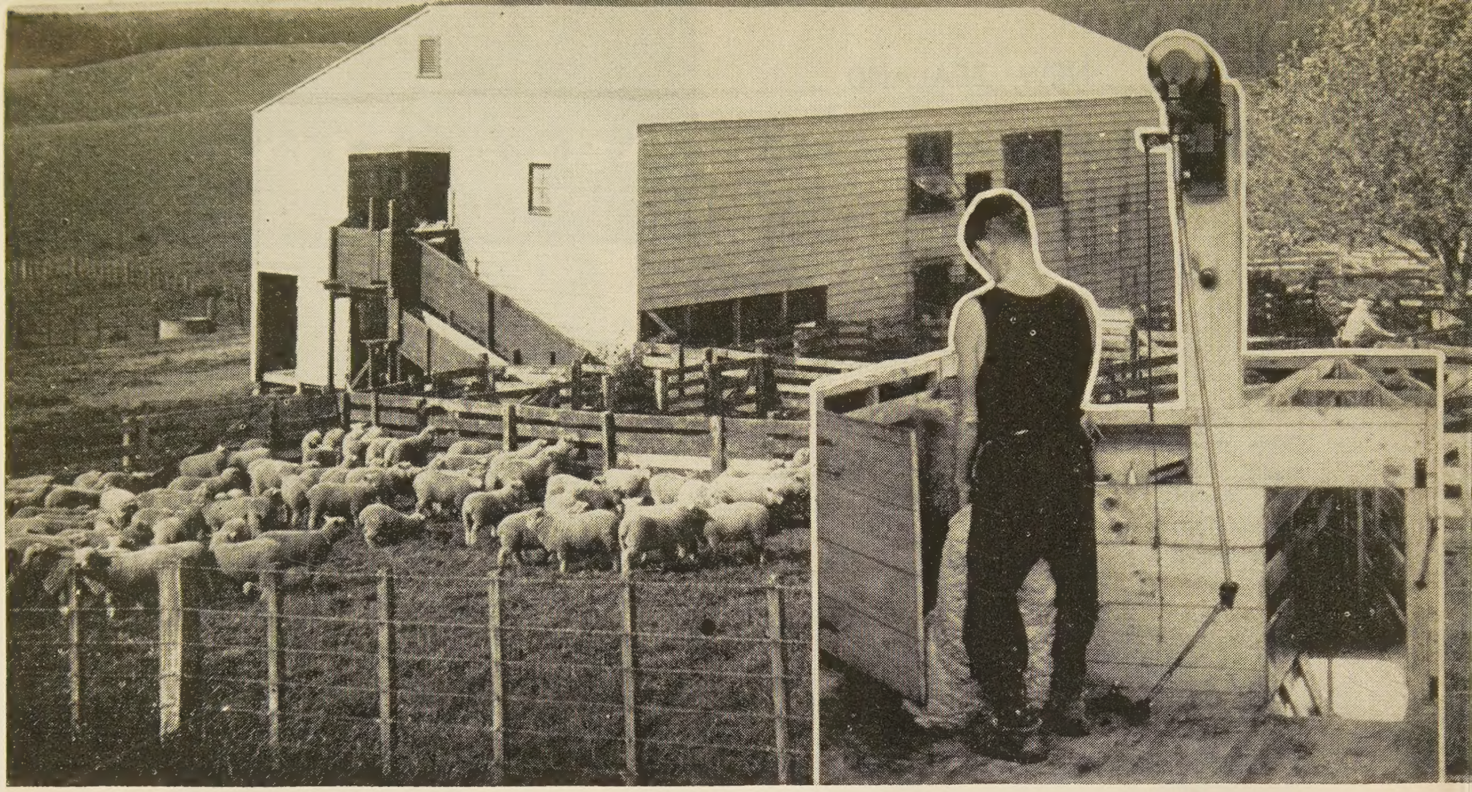


Chute Woolsheds

A RAPIDLY increasing national sheep flock, establishment of new sheep farms, and a switch by some dairy farmers to fat lamb production have emphasised the inadequacy of some existing woolsheds and created a keen demand for plans for new ones. In this first of two articles by D. G. Austin, Sheep and Wool Instructor, Department of Agriculture, Auckland, advantages of chute woolsheds are outlined. In the second article, which will appear in the June issue, shed capacities, woolrooms, and plans for sheds will be discussed.

TOO often the building of a woolshed is undertaken without enough consideration of its eventual incorporation in a complete sheep handling unit, which ideally should incorporate:

Woolshed
Sheepyards
Sheep dip or spray race
Foot-rot bath
Stock-loading ramp
Cattleyards and crush (where numbers of cattle are carried)

The design of the unit as a whole should be the first consideration in siting the shed. Features in placing a unit are:

It should be as central as possible to reduce droving.

Road access must be good, especially in wet weather.

It should be near an electric power supply, since reticulation can be costly.

It should be handy to the homestead, but not to the extreme of creating a dust and noise nuisance.

It should be near a good water supply.

It should be sheltered from prevailing winds; however, where the sheepyards do not dry quickly after rain, over-sheltering can be a disadvantage.

The site for the yards and dip should be well drained.

Ground contours must be studied to find those that will suit the sheepyards and require least adaptation for the woolshed foundations.

No one plan will incorporate all sections of a unit and suit all farms. Rather, merits of individual sites must be exploited and disadvantages overcome.

One end of a chute woolshed is occupied by the woolroom and facing

ADVANTAGES

- It suits some sites better than other kinds of woolshed.
- Shearers have less distance to drag a sheep than in other woolsheds.
- The short distance between table and shearers gives the fleeco more time for sweeping and sorting.
- The fleeco is less tired at the end of the day and therefore more efficient, which affects the table hands' efficiency because of the better state in which fleeces reach the table.
- Shearers shear more sheep and are not hampered by traffic along the board.
- Where a classer is employed he can see the whole shed at a glance.
- Extremes of heat are reduced, because shearers are not working in a confined space on an outside wall, but are in one large room.
- A raised board further segregates shearers and reduces the fleeco's work.
- Ideal for handling short wools on the board.

this end are the shearing units along an internal wall.

For best all-round light the woolroom end should face generally north, a slight slope to the north being an advantage. Of course, some variation of the direction cannot always be avoided.

The chute woolshed is not new; some were built before the war, and the principle was used in sheds in Australia and New Zealand in very early days. The main point is that portholes and machines are placed directly alongside the catching-pen doors. The whole is mounted on an internal wall about midway across the shed. From the portholes chutes take the shorn sheep to pens below the catching pens or outside.

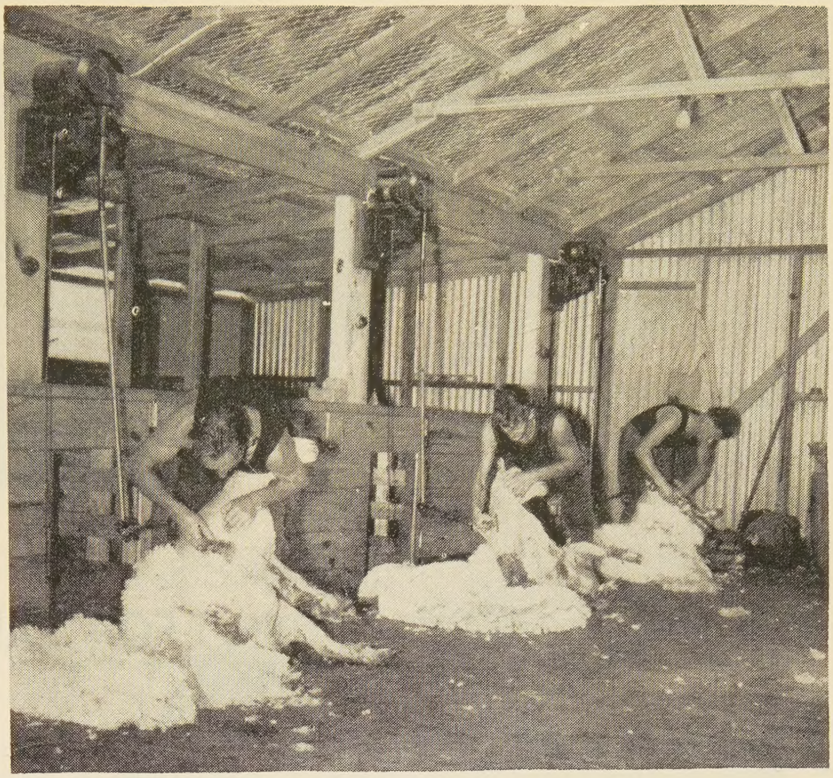
Advantages of the shearing board facing the woolroom instead of being on an outside wall are:

Compactness

The area of flooring used as a board occupies much less space in the shed. The board is only about 5 ft 6 in. wide and may be part of the woolroom or be set back from it.

Speed

The wall behind the board carries catching-pen doors, machines, and portholes. As a sheep is brought to a position just outside the catching-pen door to be shorn and let go, a shearer has 5 ft to 6 ft less to drag each sheep.



When three sheep are finished at the same time in a chute woolshed it is easy for the fleeco to pull two fleeces back and pick up the third.

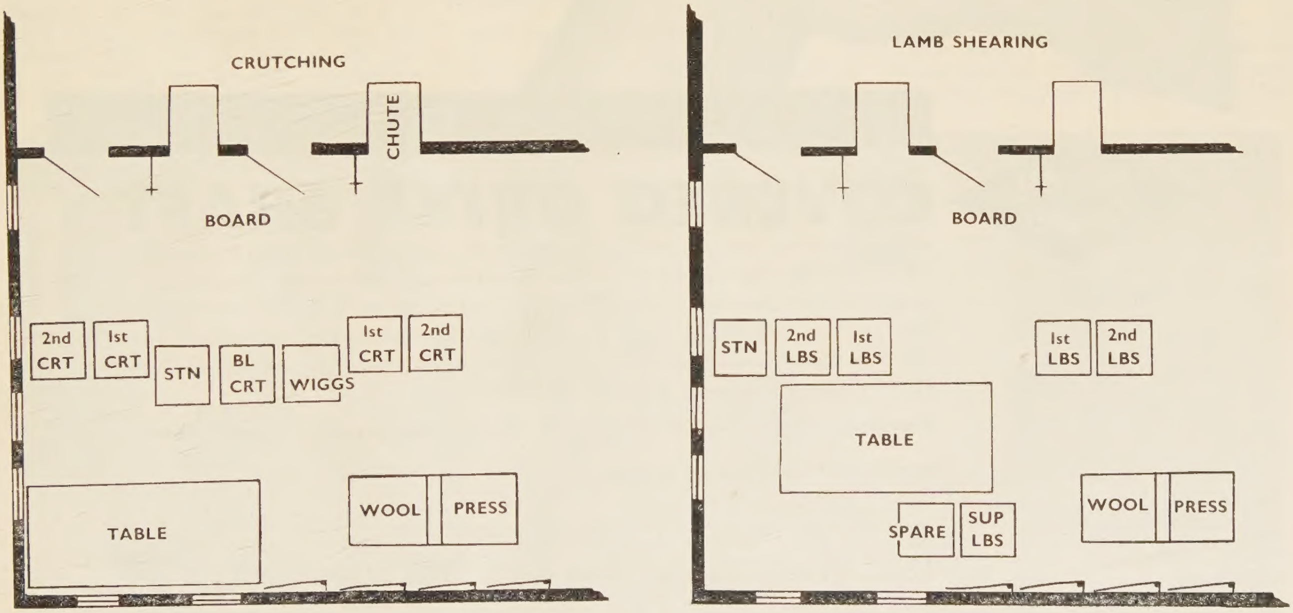

CRUTCHING
CHUTE
BOARD
2nd CRT
Ist CRT
STN
BL CRT
WIGGS
Ist CRT
2nd CRT
TABLE
WOOL
PRESS
LAMB SHEARING
BOARD
STN
2nd LBS
Ist LBS
Ist LBS
2nd LBS
TABLE
SPARE
SUP LBS
WOOL
PRESS

Fig. 1—Setting up chute woolsheds for crutching and lamb shearing. The table need be used only when super types are being sorted. The containers shown are woolpacks on fadge frames.

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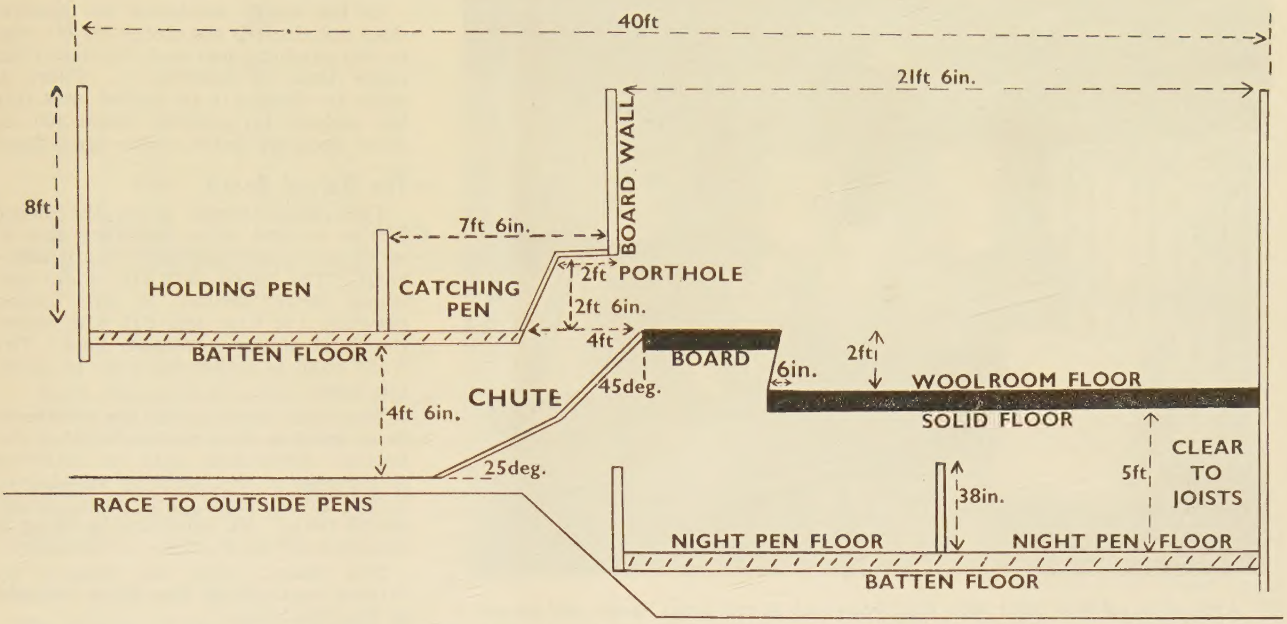

40ft
21ft 6in.
8ft
BOARD WALL
7ft 6in.
HOLDING PEN
CATCHING PEN
2ft PORTHOLE
2ft 6in.
4ft
BATTEN FLOOR
BOARD
2ft
6in.
WOOLROOM FLOOR
SOLID FLOOR
4ft 6in.
CHUTE
45deg.
25deg.
CLEAR TO JOISTS
5ft
38in.
RACE TO OUTSIDE PENS
NIGHT PEN FLOOR
NIGHT PEN FLOOR
BATTEN FLOOR

Fig. 2—Cross-section of raised board shed showing the relationship of floor levels in pens, board, and woolroom and the slope of the chute.

Labour Saving

The shearer drags, carries, or walks his woolly sheep a total of about ¼ mile less per day. The fleeco travels half the distance or less in carrying fleeces to the table and sweeping the board. The wool table in the 2-stand shed is only a few feet from each shearer. In the 3-stand shed it is a little nearer the fastest man than the slowest, and with 4-stand sheds one or two tables can be used depending on the shearing speed.

Time saved for the fleeco helps to ensure that the board will be kept clean and the sweepings will be well picked over and shaken out. There should be no unsorted accumulations of wool on the floor or board.

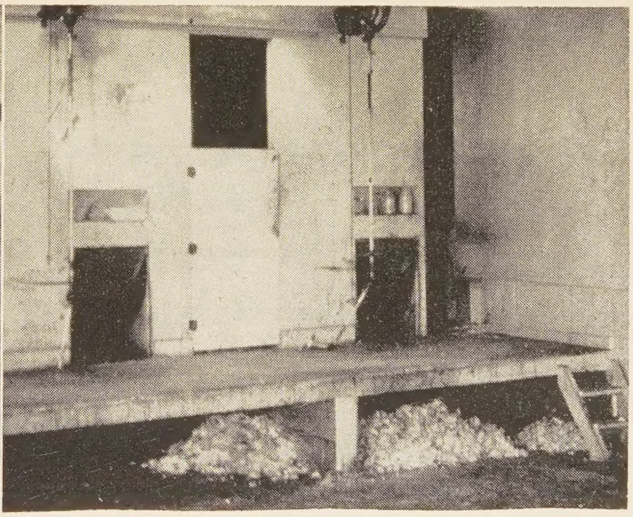
Handling Crutchings, Lamb's Wool, and Second Shear

At crutching a chute woolshed is especially suitable for handling the wool direct from machine to woolpack. A row of fadges placed handy to the shearers allows crutchings to be sorted as they fall from the sheep rather than picking up and resorting on the table. This also applies to shearing lambs and to short second shear.

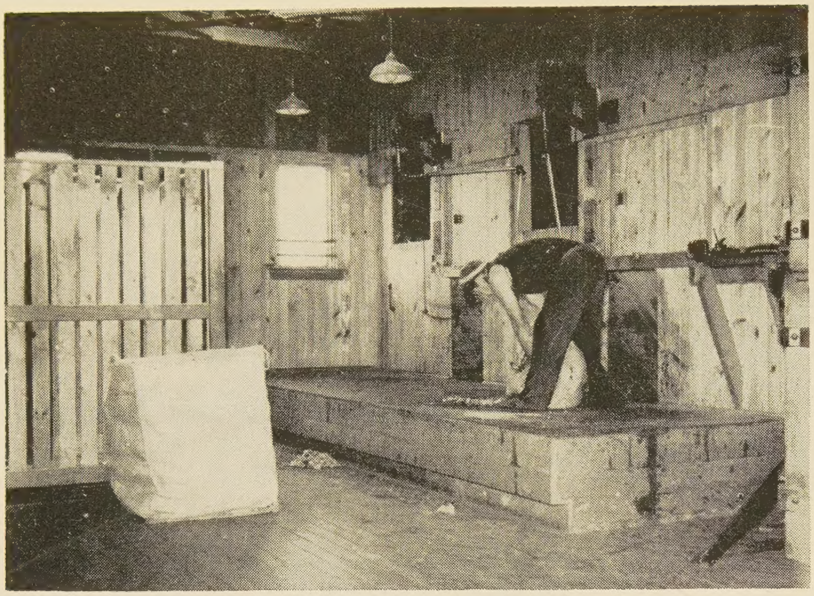
Improved Shed Supervision

The owner, classer, or person in charge can see everything in the woolroom and board at a glance. From the

▲ With a low (1 ft 6 in.) raised board the corn broom can still be used. A bin and fadge are in handy positions for crutchings.



▲ Where space is left below the board bellies or locks may accumulate and wool kicked in by passing feet is mixed with them.



A raised board is an asset when short wools such as crutchings, lambs, and second shear are being handled. Off sorts can be picked out while a sheep is being shorn.

table good control of the board and the woolroom can be retained.

Conditions for Fleeco

In the chute woolshed the shearer does not disturb the fleece on his way to the catching pen and the fleeco has more time to remove it. There is room for fleeces to be pulled back into the picking up position when two or more shearers finish at the same time.

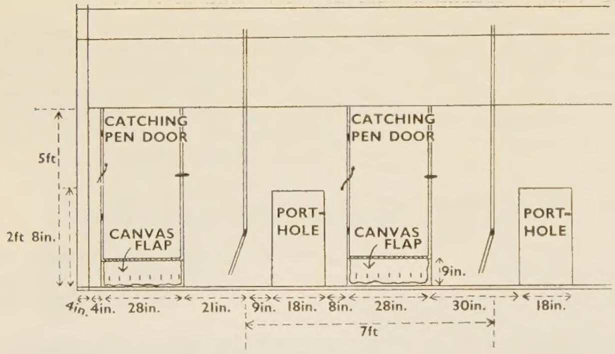
The Raised Board

The raised board gives the fleeco less to do and he is therefore able to serve the board and table more efficiently. The board (5 ft 6 in. wide) and sheep pens behind it are raised between 1 ft 6 in. and 2 ft 6 in. above the level of the woolroom floor. The front edge is under-cut 6 in. to allow toe room.

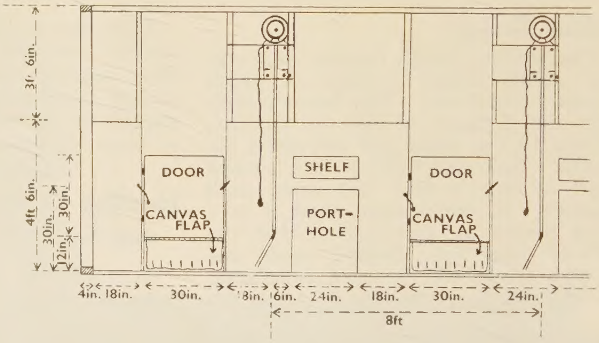
The fleeco works from the woolroom floor, leaning over and picking up the fleeces. Sweepings may be collected to the edge of the board by an adapted broom or a scraper and immediately sorted there. No continual bending to handle wool on the floor is necessary.

This board helps the shearer by further segregating him from the rest of the woolroom.

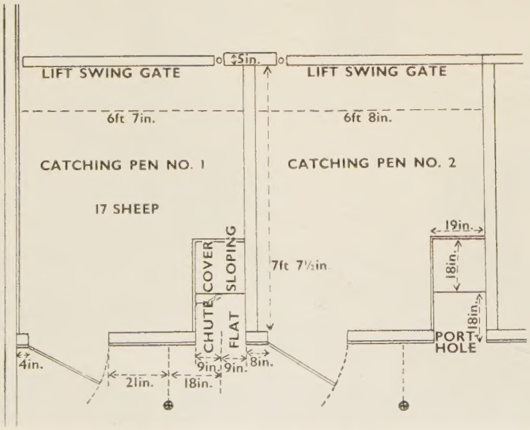
A disadvantage is that raising the floor level must increase stud height


CATCHING PEN DOOR
CATCHING PEN DOOR
5ft
2ft 8in.
CANVAS FLAP
PORT-HOLE
CANVAS FLAP
PORT-HOLE
9in.
4in. 4in. 28in. 21in. 9in. 18in. 8in. 28in. 30in. 18in.
7ft

Elevation of board wall.

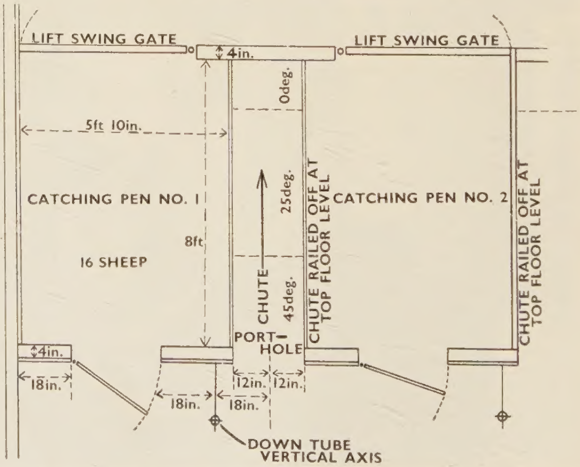

3ft 6in.
4ft 6in.
30in.
30in.
12in.
DOOR
SHELF
DOOR
CANVAS FLAP
PORT-HOLE
CANVAS FLAP
4in. 18in. 30in. 8in. 6in. 24in. 18in. 30in. 24in.
8ft

Elevation of board wall.


LIFT SWING GATE
5in.
LIFT SWING GATE
6ft 7in.
6ft 8in.
CATCHING PEN NO. 1
CATCHING PEN NO. 2
17 SHEEP
19in.
CHUTE COVER
SLOPING
FLAT
7ft 7½in.
18in.
18in.
PORT-HOLE
4in.
21in.
18in.
9in.
9in.
8in.

Plan of board wall and pens.

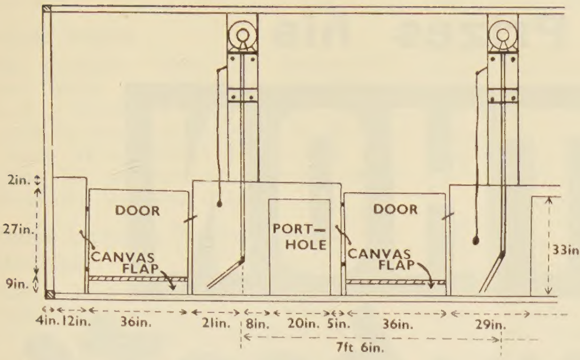
Fig. 3.


LIFT SWING GATE
4in.
LIFT SWING GATE
0deg.
5ft 10in.
CATCHING PEN NO. 1
CATCHING PEN NO. 2
25deg.
16 SHEEP
8ft
CHUTE
45deg.
CHUTE RAILED OFF AT TOP FLOOR LEVEL
CHUTE RAILED OFF AT TOP FLOOR LEVEL
PORT-HOLE
4in.
18in.
18in.
18in.
12in.
12in.
DOWN TUBE VERTICAL AXIS

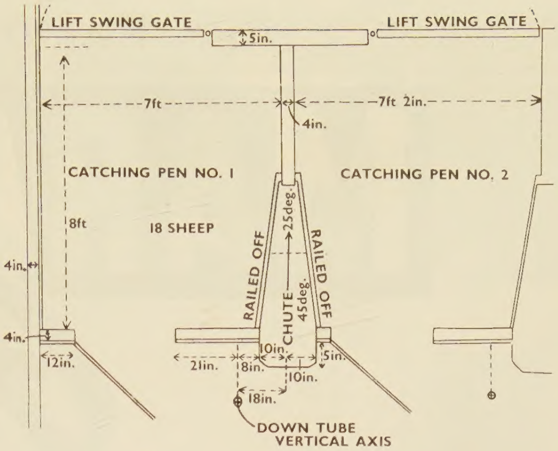
Plan of board wall and pens.

Fig. 4.

Variations in measurements of board walls and pens are shown in the drawings at left and at right. For example, the porthole width in the drawings at left is 18 in. and at right is 24 in. The extra width has the advantage of allowing for errors in position by shearers, particularly learners.


2in.
27in.
9in.
DOOR
CANVAS FLAP
PORT— HOLE
DOOR
CANVAS FLAP
33in.
4in. 12in. 36in. 21in. 8in. 20in. 5in. 36in. 29in.
7ft 6in.

Elevation of board wall.


LIFT SWING GATE
5in.
LIFT SWING GATE
7ft
7ft 2in.
4in.
CATCHING PEN NO. 1
CATCHING PEN NO. 2
8ft
18 SHEEP
25deg.
RAILED OFF
CHUTE
45deg.
RAILED OFF
4in.
4in.
12in.
21in.
18in.
10in.
5in.
10in.
18in.
DOWN TUBE VERTICAL AXIS

Plan of board wall and pens.

Fig. 5—The porthole widths in the drawings at the bottom of the opposite page are 18 in. and 24 in. Here the width is 20 in. Other variations in construction are also shown.

and wall area. This is minimised if the step is reduced to 2 ft; 1 ft 6 in. is rather low.

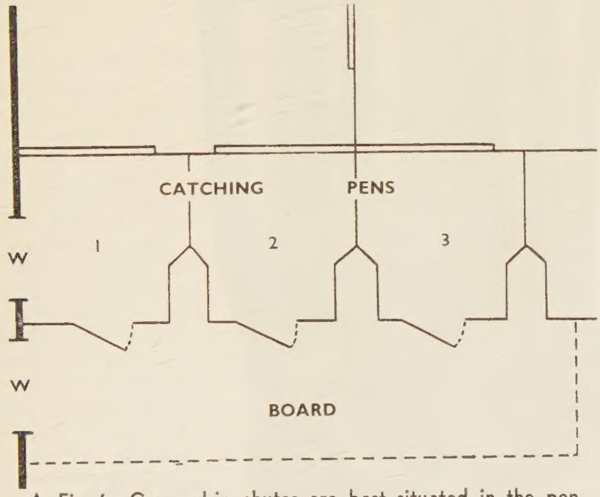
Height of Board Wall

The height of the solid portion of the wall between the board and catching pens has varied from 5 to 6 ft down to much less. The higher walls are presumably to prevent sheep balking at movement on the board when they are being penned (Fig. 3). However, it does not seem to have made penning up much easier; usually the pens are much darker, and sheep draw best toward a well lit area. A sound practice has been to make the wall portion 4 ft 6 in. high and the catching-pen doors 3 ft 6 in. high (Fig. 4). This is the best height for a shearer who has just put his handpiece on the floor and is still straightening up to put a hand on the door to open it. Higher doors would be better blocked open while shearing.

Catching-pen Doors, Machines, Portholes

A strict relationship of catching-pen doors, machines, and portholes must be maintained, especially where the limiting factor is the length of wall. In 2-stand and 3-stand sheds this is not a difficulty, but in a 4-stand shed or greater a shed width of over 30 ft brings problems in roof construction. In these sheds not all the width can be used for the board, for an internal passage or ramp of about 4 ft should be left for access from night pens below the woolroom, and the end porthole cannot be placed less than 21 in. from the corner.

Four stands or more are best run in the same direction as the roof ridge; then the distance between stands need not be restricted and access to pens is good.


CATCHING
PENS
1
2
3
W
W
BOARD

▲ Fig. 6—Covered-in chutes are best situated in the pen division where they provide the least obstruction in the pen.

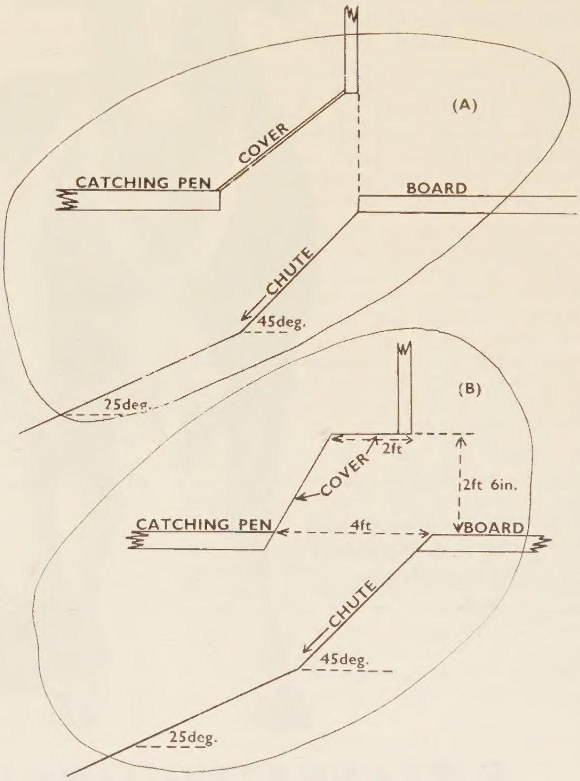

(A)
COVER
CATCHING PEN
BOARD
CHUTE
45deg.
25deg.
(B)
2ft
2ft 6in.
COVER
CATCHING PEN
4ft
BOARD
CHUTE
45deg.
25deg.

Fig. 7—Chute covers if used should be box shaped ➔ as in B. The cover in A makes it difficult to put sheep through the porthole. Both systems are draughty and dark.

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Combinations of measurements are shown in Figs. 3, 4, and 5. Requirements are:

Porthole Width

The porthole width in woolsheds varies about a standard of 20 in. (Fig. 5). Though a minimum of 18 in. is used in some sheds (Fig. 3), 22 in. or even 24 in. allows for errors in position by professional shearers and particularly learners (Fig. 4).

Distance between Porthole and Machine

This is best defined as the distance between the machine down tube and porthole centre and is **fixed** at **18 in.**, being the average distance from the machine that the sheep will be when the last blow is taken. The width of the porthole is the important point. With a porthole 2 ft wide the down tube would hang 6 in. from the edge or, with a 20 in. porthole, 8 in. from the edge. In many woolsheds the machine down tube is much too close to the porthole.

Distance between Machine Tube and Catching-pen Door

This distance should not be less than 18 in. (Fig. 4) and about 21 in. is best (Figs. 3 and 5). While this portion of the wall protects the shearer from striking the handpiece as he comes out with a sheep, too great a distance places the catching pen door at the extreme left of the pen (Fig. 3). This makes a longer and roundabout route for bringing sheep to the stand. Shearers do not usually drop their handpiece at the full stretch of the down tube nor should they have to put it back directly under the cone. The measurements given allow good access to the sheep in the pen and protect the normal rest position of the handpiece.

Catching Pens, Doors, Chutes

Catching-pen doors should be near the centre of the pen, making sheep in all parts of it within easy reach. Catching-pen walls should fall at or near the centre line of the chutes; each chute will then project partly (10 to 11 in.) into each pen.

In a 4-stand shed, however, restricted to 30 ft wide, the chute must lie wholly in the corner of its own catching pen and the door position will be off-centre (Fig. 3).

Suitable types of catching-pen doors for chute woolsheds are:

Light bat-wing door 2 ft 6 in. x 2 ft 6 in. set to swing 9 in. from floor level. A canvas strip on the lower edge prevents contact of the door with sheep's legs or handpiece. This also allows the door to close over a sheep's legs. The canvas should fit the gap between the lower edge of the door and the floor sufficiently to prevent patches of light showing, since these cause sheep to balk when penning-up.

Double or single weighted canvas curtains are suitable if doors or hurdles can be dropped in when sheep are left in the pens. The customary clear door width is 2 ft 6 in. There is no reason for narrower doorways except where shed width is limited. Narrower doors are a serious disadvantage for large shearers handling big sheep.

Twin doors are not popular because the shearer must pull the sheep round the near door before pulling back to the shearing position; they may be obstructed by sheep in a full pen, and in swinging may hit a shearer on the back as he is withdrawing.

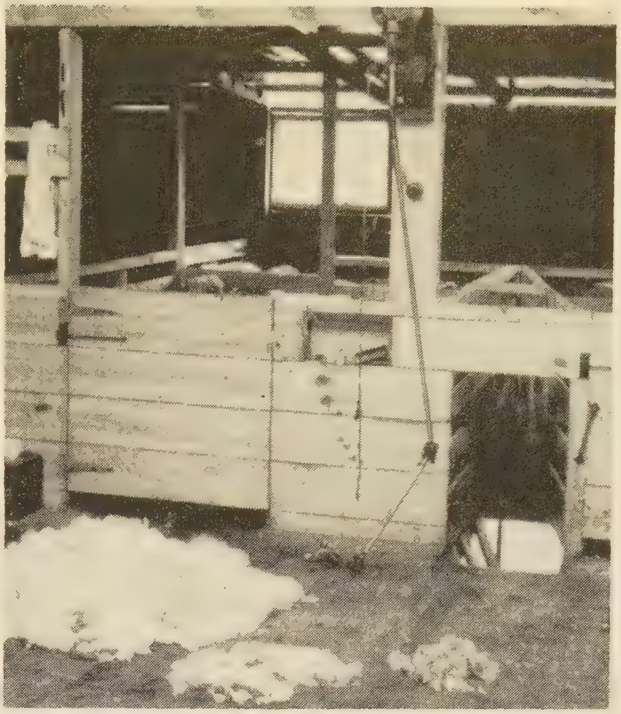
Still wider catching-pen doors are possible (Fig. 5). Three-foot doors only 38-in. high have many advantages if the door is wooden. The leverage to open it is less, as is its weight. The shearer does not need to go squarely through the doorway. The wider doorway is easier to find when backing out of the pen and does not catch the shearer's elbows.

The height given for this door (38 in.) when used throughout the length of the board wall has been found excellent and refutes arguments that sheep will not enter a catching pen unless high walls prevent sight of movement.

The catching pens, however, must be very well lit. The low board wall of course helps to do this because the catching pens receive the same light as reaches the board. The low board wall and pen walls of the same height without a forest of studs above them combine to make a pleasant, well lit, and fast working shed.

The chute covers once followed the slope of the chute slide, but now they are being made part box-shaped, sloping off only slightly at the back end (Fig. 6).

It is easier to put sheep down the chute, since more room is left for the animal's head before it starts down the slope. This also prevents sheep in the catching pen from climbing up the cover, which now may be used as a shelf for the shearer's equipment and is part of the pen wall.



The width of the area used by a shearer is not more than 5 ft 3 in.

Two more recent methods of handling the upper end of a chute are a divided pen rail (Fig. 5) and the chute railed off completely and open above for its full length (Fig. 4).

Advantages are less draught through the porthole, since most of it goes straight from the chute into the roof; more light on the chute slide makes it easier to put sheep out the porthole; and the catching pens are of more regular shape and unobstructed.

Chutes may start at the bottom edges of portholes or be cut forward up to 9 in. into the board (Fig. 6). In the second method sheep do not have to be put through the porthole before their weight carries them down the chute, but against this a little more wool may be carried down the chute than if the bottom edge ends flush with the board wall, which is recommended.

Where the top of the chute is covered in measurements are: a first drop of 6 in. followed by one of 3 ft in 3 ft (or 45 degrees). The slope is then reduced to about 25 degrees until ground level. Chutes should be straight, as sharply curved or right-angle bends at or near the steeper slope may cause injury to animals The slide should be clear of battens or cleats, because sheep may go over on their knees and chin with risk of injury.

Chutes should not be any steeper; otherwise sheep go down too fast.

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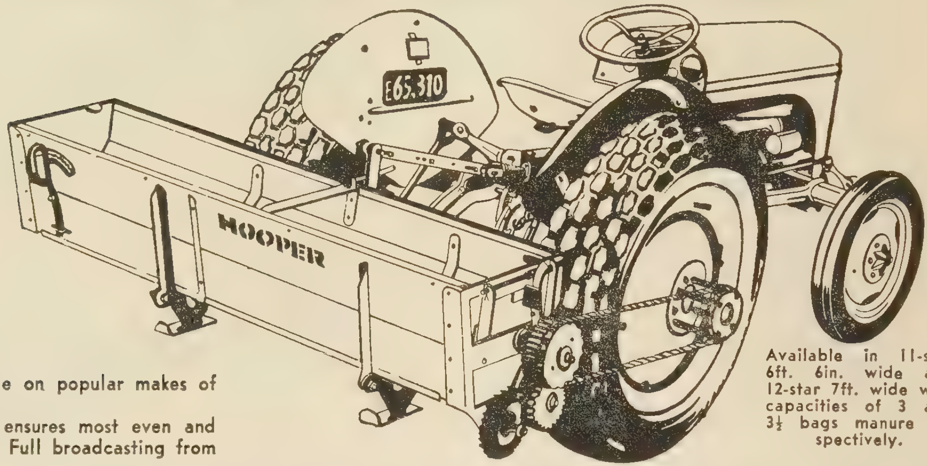

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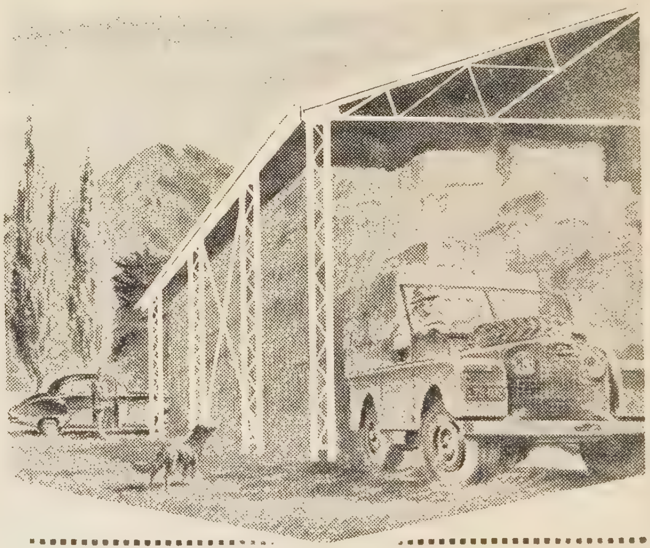

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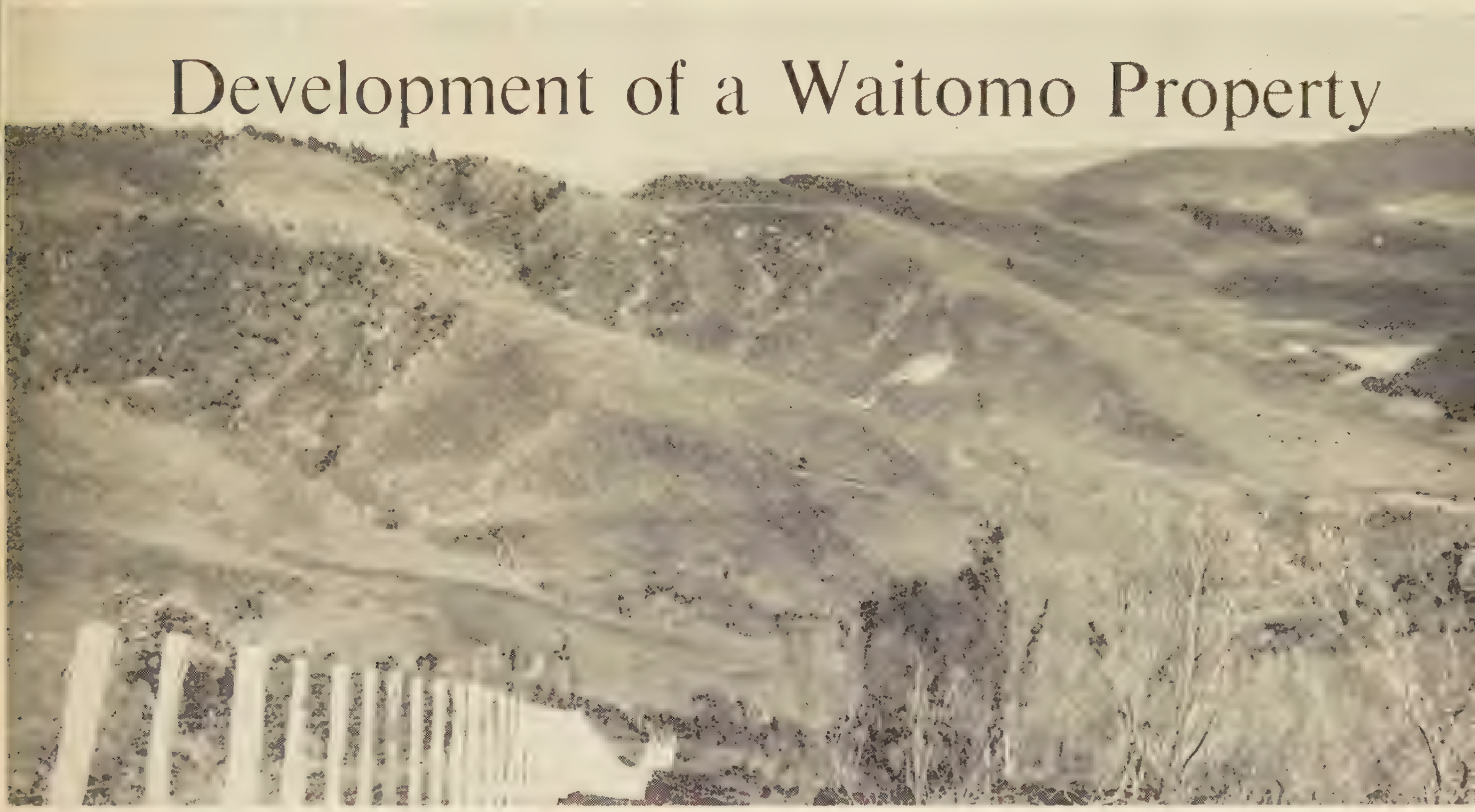
Studies in Farm Management

By W. L. OSBORN,
Farm Advisory Officer,
Department of Agriculture,
Te Kuiti

Development of a Waitomo Property



HEADING PHOTOGRAPH: One hundred and sixty acres of new development sown in autumn 1958 and now subdivided into three paddocks. Subdivision of surface burns is essential for development.

THE landscape of Waitomo County, like that of the rest of the King Country, is changing rapidly. The district's carrying capacity, its sheep and cattle flocks, and its general prosperity, including that of its towns and townships, are improving very quickly. No better illustration of this can be found than in the history of a property in the King Country described here.

IN 1952 Messrs T. N. Watson and G. G. Beaven acquired a totally unimproved section of 673 acres at Puketutu which was offered for settlement by the Crown. Within eight years the carrying capacity of this same section, which was originally all fern, scrub, and second-growth bush with only 1 acre of grass, has been so increased that it now winters 2,500 sheep and 116 cattle and fattens 1,500 lambs and wethers a year. This rapid development of a property notoriously prone to ragwort and grass grub infestation has not been done without setbacks. Success has been assured, however, by the high standard of management and work output, high expenditure on, and judicious use of, fertiliser, DDT, and hormone weedkillers, and sound stock management.

The property is at the northern tip of the Taranaki Land District bordering the Mokau River, and is three miles north-west of Puketutu and 12 miles south of Te Kuiti. The country is rolling with steeper ridges on two sides.

The soil is volcanic (Mairoa ash on rhyolite and sandstone) and its texture is characteristically light. It is a free-draining silt loam of medium natural fertility, but is very responsive to phosphates.

Rainfall is well spread, averaging 60 in. per year, but there are occasional dry periods and droughts, especially in February and March. Of the total area of 673 acres, 138 acres is still in heavy bush and scrub, with another 35 acres in rough gullies and swamps; the effective grass area is 500 acres

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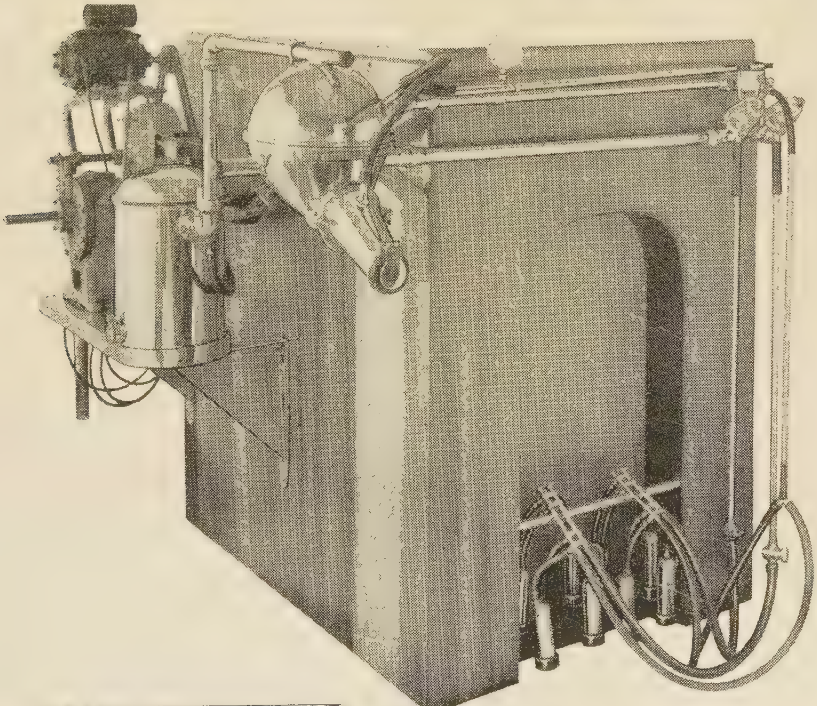

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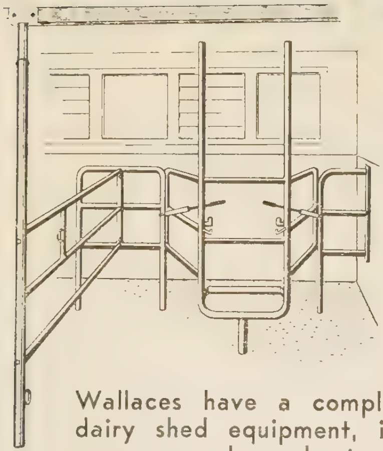

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and on this the carrying capacity is already over five ewe equivalents per acre, without its potential being reached.

HISTORY OF DEVELOPMENT

The property was taken up in 1952, when the first block of 150 acres was crushed with a wheel tractor, burnt, and cultivated; it was sown the following autumn. A period of intensive operations followed without the partners residing on the property full time. In 1956, when 360 acres were in grass, the partnership was dissolved and Mr Beaven took up residence and full control. Cropping began in 1957 and its subsequent intensification has enabled most of the 200 acres infested with grass grub to be regrassed; a further 70 acres has been oversown. The back section of the farm, being much steeper and more broken, was not touched until 1958, when 75 acres was disced and sown to grass and a further 75 acres was surface sown after the burn.

Ragwort and Grass Grub

A large part of the early sowings on the easier country became heavily infested with grass grub, and ragwort became dominant in some paddocks. This caused a serious setback, over 90 ewes being lost through ragwort poisoning in one year. However, intensive spraying, dusting, and cropping and use of DDT for grass grub control overcame this problem, at a fairly substantial cost. At one stage it was doubtful whether the ewe flock, which had been built up to a high standard could be retained, but careful management, use of a mob of 500 wethers, and spraying and dusting with hormone weedkillers quickly reduced the ragwort, and the ewe flock was saved. However, paddocks which had been in good heart deteriorated rapidly and fireweed became dominant and a serious nuisance in certain areas. Cropping and regrassing had to be increased to cope with this deterioration. The major triumph, however, has been the control of grass grub.

Heavy Topdressing

Nearly 600 tons of superphosphate has been applied in the last six years over the 500-odd acres of this property, most of which has received more than 25 cwt per acre. Of the 600 tons, 91 tons was DDT superphosphate, and 15½ tons of muriate of potash and 120 tons of lime have also been applied. Within the same six-year programme 265 acres of new grass has been sown.

The original cover of the section: Fern and second-growth bush and manuka scrub 12 to 20 ft high.

Fencing

Fencing is another major and very expensive item in bringing in land. Fortunately the property's carrying capacity has been so well developed that intensive fencing has not been essential, as large mobs of stock were readily available for control. Subdivisional fencing has largely awaited the cropping programme, and the farmer considers that for his conditions 25 to 30-acre paddocks are ideal. However, over the period more than 9½ miles of fencing has been completed, including 7½ miles internal subdivisions necessary for the present 21 paddocks. All the fencing has been erected by the farmer, and in the early years was done successfully with six barbed wires and wide spacings for posts and battens.

Farmer's Recipe for Success

1. Spend as much money as can be spared on manure.
2. Stock up to the maximum and winter as many stock as can be kept alive and healthy.

Stocking

The stock figures in Tables 1 and 2 show the general pattern of stocking which has contributed so much to the success of the farm. Calves did well on the new grass in the early stages, and later as a breeding herd gave maximum flexibility with the rapid build up of sheep numbers. After discing, second growth was not as great a problem as before, and these cattle were able to cope with the remaining scrub (manuka and heather), as it was the only roughage available to go with the lush feed and copious clover produced on the cultivated land. The heavy cropping and haying on this property have permitted the wintering of large numbers of stock and, with additional purchases of stock for fattening, all grass grown has been used efficiently.

TABLE 1—CARRYING CAPACITY AND WOOL PRODUCTION

Winter		Breeding ewes	Breeding cows	Wool production bales
1953	..	Nil	87 calves	Nil
1954	..	225	87 heifers	5
1955	..	390	84 cows	8
1956	..	480	80 cows	12
1957	..	800	75 cows	27 (9,962 lb)
1958	..	865	37 cows	33 (12,278 lb)
1959	..	1,140	37 cows	49 (19,627 lb)
1960	..	1,580	40 cows	69 (25,025 lb)

TABLE 2—STOCK WINTERED

Winter		Total sheep	Total cattle	Crop area acres	Grass area acres	Total manure tons
1958	..	1,465	105	70	465	98
1959	..	2,300	81	55	480	86
1960	..	2,500	116	23	512	90

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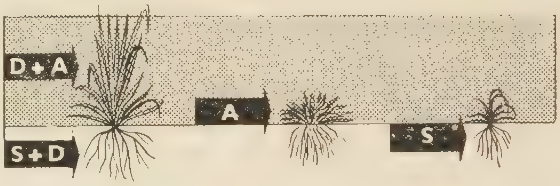

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Autumn-sown pasture overdrilled on chou moellier stubble in April 1959 and covering over well when six months old.

Buildings

A small woolshed, sheep and cattle yards, and a hay barn were the first facilities erected. An old building on the property served as a bulk manure shed, and a very old cottage was used as living quarters for 18 months. Since 1956 a modern brick residence, a 70 ft x 25 ft implement shed, and a further large hay barn have been built, and extensions to the woolshed are contemplated.

Labour and Plant

The farmer has a record of achievement to be proud of and his contribution toward the enterprise has been outstanding. Crushing was originally done with a wheel tractor. All the work on the property, including the topdressing, has been carried out by the owner, with the following equipment: a light crawler tractor with a hydraulic blade; a wheel tractor; an 11-coulter drill; a 5-ton truck with a stock crate; a home-made spinner topdresser; a hayrake and baler, and the usual discs and harrows.

Only in the last two years has aerial topdressing been done and then only on the back section of the farm. Considerable sowing and haymaking have been done for neighbours, and between 2,000 and 5,000 bales of hay have been pressed on the farm a year. Investment in plant has been heavy, but has been a major factor in the success of the enterprise, as all the work has been done with due care and on time.

During the last six years the owner has employed labour for only two periods—one young lad was employed for 12 months and another for nine months. Thorough planning and careful attention to detail were needed to do the work without outside help.

DEVELOPMENT PROGRAMME

After crushing and burning, the land was disced and harrowed and the following mixture (all certified seed) sown on a seedbed, which though rough was adequate.

	lb
Perennial ryegrass	15
Short-rotation ryegrass	7
Cocksfoot	4½
Timothy	2
Cowgrass	3
White clover	2
Mt. Barker subterranean clover	2
Sown at 28 lb per acre	35½

After two to three years of strong clover growth the original areas have been progressively cropped, first with swedes and chou moellier, then with chou moellier, and finally with new grass. Success has been achieved with overdrilling grass seed among the chou moellier stalks, using the hoe coulter drill with Blackmore tips.

The following mixture has been sown after cropping:

	lb
Certified perennial ryegrass	13
Certified short-rotation ryegrass	4
Certified cocksfoot	4
Crested dogstail	1½
Certified cowgrass	2
Certified white clover	1½
Certified Mt. Barker subterranean clover	1
Per acre	27

On some of the original pasture the following mixture has been overdrilled after harrowing:

▼ The modern brick residence which since 1956 has replaced the very old cottage that sufficed in the first four years of development of the property.

This developed country was resown to grass after a crop in 1954.

▼ Cattle with calves at foot on high-producing pastures.

	lb
Certified perennial ryegrass	7
Certified short-rotation ryegrass	3
Crested dogstail	2½
Grasslands cocksfoot	1¾
N.Z. certified cocksfoot ..	1¾
Certified white clover ..	2½
Certified cowgrass	3½
Certified Mt. Barker subterranean clover	1¼
Certified Tallarook subterranean clover	1¼
Per acre	24½

The grass seed mixtures were of high quality and were sown at an economical rate, all with very satisfactory results.

Management

Stock management has been considerably above average on this farm, the lambing percentage over the past two seasons being about 120 compared with the district average of 90 to 95 per cent. The increase in wool production on this property also proves a high standard of management.

This improvement under private land development has been achieved only by concentration on essentials, chief of which has been manure. Over the short period of eight years high capital investment has been necessary, but the extraordinarily high returns from this property prove that quick results can be obtained on this land which is typical of a great area in the Waitomo, King Country, and Waikato districts.

Nassella Tussock Control

Dense nassella in the foreground is a contrast with the experimental area in the background, where grubbing and spot spraying of scattered nassella plants are being compared.

By W. F. LEONARD,

Scientific Officer, Department of Agriculture, Christchurch

DURING the past two years more than 20 separate experiments on nassella tussock control have been established in North Canterbury. Just over half of them have been in operation long enough to have yielded results; the remainder are too recent to be finally assessed.

BECAUSE consideration was being given to the establishment of an extensive forest on nassella-infested land, a trial was begun at Waiau to test the tolerance of young forest trees to the grasskilling chemicals TCA and dalapon. A serious drought after planting and damage by rabbits killed a considerable number of young trees. However, enough survived to indicate that at the rates of application likely to be used for nassella control the species favoured for such forests would be affected markedly by both TCA and dalapon.

Time of Spraying

Using a spraying unit which applies a variable dosage as it passes over a plot, a trial was established in which dalapon and amitrol were applied to mature nassella tussock at monthly intervals for a year.

The aim was to determine the time of the year when nassella is most readily killed. Much work on this aspect had already been done, but confirmation in another season was sought. Amitrol was not significant as a killing agent, but results from the use of dalapon did confirm earlier work. This had shown that nassella is most susceptible to TCA and dalapon at the driest time of the year. In nassella-infested districts January and February are usually the driest months, but the season covered by this trial was unusual in that the spring of 1958 was exceptionally dry in North Canterbury. The results reflected these conditions, as a complete kill of nassella tussock was secured with dalapon at much lower rates than is usually possible during spring.

Detailed results are shown at the top of page 427.

Two experiments, each using 144 plots, were established on mature tussock to test TCA, dalapon, and amitrol applied at various seasons of the year, with oversowing also to be done at intervals after spraying. Spray was applied in October, January,

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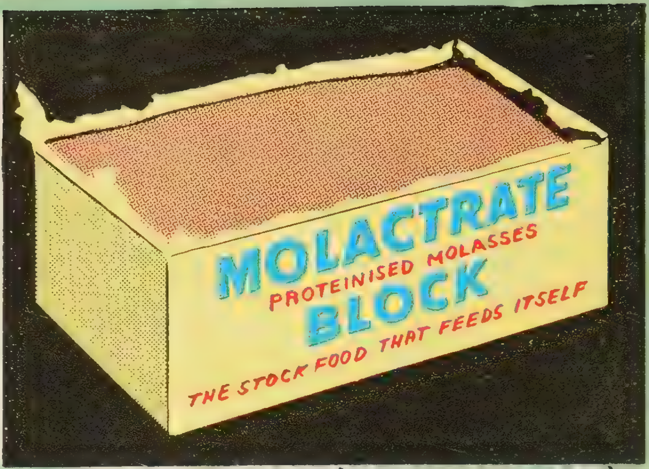
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TIME-OF-SPRAYING TRIAL

Month applied	Dalapon required for 100 per cent kill lb per acre
September	30
October	20
November	10
December	15
January	15 to 20
February	20
March	30 to 35
April	60
May	60 to 65
June	75
July	More than 80
August	More than 80

February, March, April, and July, and on each occasion sufficient plots were sprayed to allow some to be sown the same day, some a month later, and the remainder two months later. Sowing was therefore done every month of the year, with some overlapping during the normal sowing season of autumn and early winter.

With dalapon and amitrol killing results were in line with those of the trial done with the variable dosage machine. The effectiveness of TCA at 120 lb per acre was, generally, intermediate between that of dalapon at 20 lb per acre and of dalapon at 40 lb per acre.

One reason for including TCA in the trials was to determine whether the particular herbicide used for killing the tussock influenced the establishment of subsequently oversown pasture species. Results indicate that provided the nassella is killed, neither TCA nor dalapon has any noticeable effect on pasture establishment.

The best oversowing results were obtained from autumn and winter sowing. A notable feature of one trial, though, was the successful establishment of *Phalaris tuberosa* sown in October of a drought year.

The complex nature of these trials arose from a desire not only to assess the most suitable seasons for spraying and sowing but also to investigate the need for an interval between spraying and sowing. Because of the large number of treatments, it was possible to separate spraying and sowing by a maximum of only two months. Even within this time, though, a pattern of behaviour of the various sown species began to take shape and emerged quite clearly in a time-of-sowing trial which is now described.

Time of Sowing

A block of mature, dense nassella was sprayed in February with dalapon at 40 lb per acre in 30 gallons of water, sufficient tussock being treated to allow a series of topdressed and oversown plots to be laid down monthly over the following 16 months.

All plots in each monthly sowing were treated with phosphate and molybdenum as a basal dressing, and superimposed on those were additional separate treatments of gypsum and sulphate of ammonia.

Coloured pegs mark single plants in a trial comparing rates of dalapon as a spray and as a dust at various seasons.

A comprehensive seed mixture was broadcast over all plots, the clover seed sown in half of each plot being inoculated and the remainder not inoculated. Included in the seed mixture were perennial ryegrass, cocksfoot, *Phalaris tuberosa*, white clover, cowgrass, lucerne, and subterranean clover.

One of the main aims was to determine how much time, if any, should elapse between spraying and oversowing. If there is a complete kill of tussock, there are three reasons why this time interval could be of importance.

1. There may be a residual toxicity from the dalapon which could affect seedlings of pasture species sown shortly after spraying.

2. There could be a period before the standing nassella begins to collapse during which sown species might suffer from competition for light.

3. During the time the dead nassella is decaying fertility factors such as temporary nitrogen deficiency could arise.

In addition, of course, certain seasons of the year are more suitable for oversowing than others.

Questions Answered

No evidence of residual toxicity from dalapon was obtained, even on plots sown immediately after spraying. A complete cover of nassella tussock was present at the time of spraying, so that no dalapon fell on bare ground.

Competition for light appeared to be important during the first few months after spraying. Grasses are better able to compete for light in the early stages and plots sown during the first two months after spraying were grass-dominant (especially with *Phalaris tuberosa*). Plots sown three months after spraying contained a little cowgrass and lucerne, but were still grass-dominant, whereas those sown during the next two or three months contained a satisfactory balance of sown grasses and clovers. Some very good plots were thus sown during winter.

Monthly sowings were continued through spring, summer, and into autumn. Early spring sowings were satisfactory, but, as could be expected, species did not establish readily on plots sown during summer.

An outstanding feature of the trial at present, however, is the poorer establishment of pasture species on plots sown during autumn (just over a year after spraying) than on those sown a few months after spraying. Soil and weather conditions were most favourable when these plots were oversown, but weeds had replaced the dead tussock and these must have provided serious competition for the seedling pasture plants.

These later sown plots will probably improve over the next year or so, but the significant point is that the transition from nassella to a complete and competitive pasture cover should be

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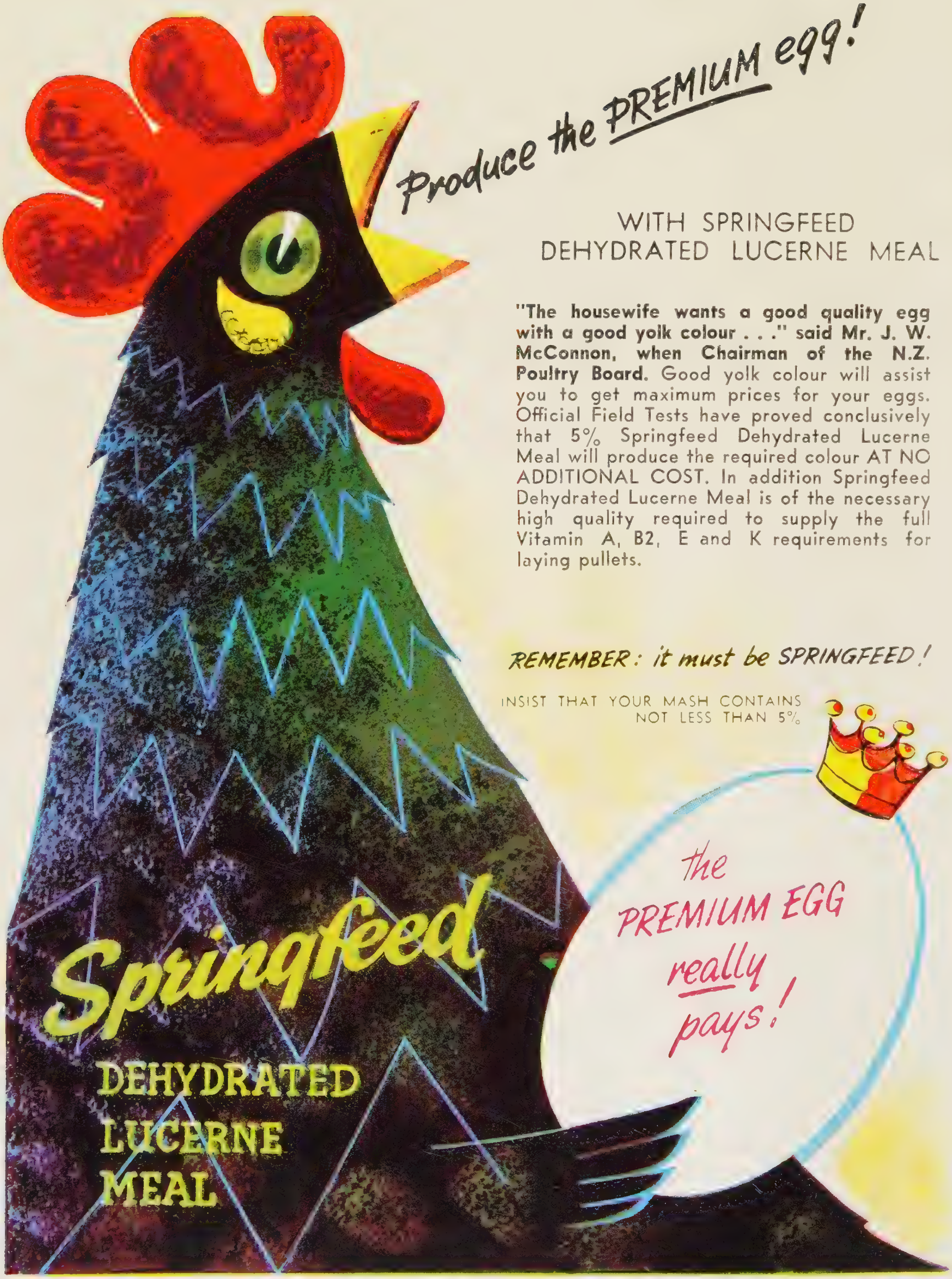

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as quick as possible if regeneration of nassella tussock is to be suppressed.

Oversowing of killed nassella should therefore be carried out within six months of spraying.

Of the fertiliser and inoculation comparisons within each monthly sowing, nitrogen gave a limited response on the early sown grass-dominant plots, but no nitrogen response was seen on those containing a balanced cover of grasses and clovers. A slight response to sulphur was observed, but there was no clear response to seed inoculation, even in lucerne.

Spot Spraying Versus Dusting

Two experiments were established to compare the effectiveness of dalapon applied in water as a spray and as a dust for killing scattered nassella plants. The rates of application were:

1. 1 oz per 10 plants
2. 1 oz per 20 plants
3. 1 oz per 40 plants
4. 1 oz per 80 plants

So that the degree of foliage cover should remain constant throughout all treatments dusted plants received ¼ oz per plant and sprayed plants 6 cc (between 1/5 and ¼ fl. oz) per plant. Each treatment was applied to 10 plants and applications were made in spring, summer, autumn, and winter, giving a total in each trial of 320 separate applications.

The plants in one trial were older and growing less actively than those in the other one and, as expected, they proved more difficult to kill.

Results

Comparing the seasons of application showed that results were fairly good in October (a dry spring) and very good in January, but poor in April and July.

During summer, which is the best time for application, the minimum effective rate was between the No. 2 and No. 3 strengths, depending on the size and age of the plants. Winter applications were ineffective, even at the heaviest rate.

Dalapon as a dust was equally as effective as the spray while ground conditions were very dry, but became less effective than the spray after the summer drought had broken. On a large scale, however, the distribution of dalapon dust would probably be difficult.

Spot Spraying or Grubbing

A block containing scattered nassella was divided into eight strips, four being spot sprayed with dalapon in water and four being grubbed. The spraying was done by a Departmental team widely experienced in this work and the grubbing by a nassella tussock board gang.

The trial was designed partly to compare the cost of the two methods, but mainly to observe the rate of reinfestation on the various strips. Half of each strip has since been topdressed and oversown, and to control grazing the trial was fenced.

Grubbing proved less expensive than spraying. The spraying was done in shorter time, but the cost of the dalapon used more than offset the saving in labour cost.

During the first year after treatment there was less bare ground on the grubbed plots than on the sprayed ones, and whether there will be more rapid reinfestation of the sprayed plots remains to be seen. So far there is no evidence that the nassella tussock board should change from grubbing to spraying of scattered plants.

Sown clovers and grasses replacing the dead nassella in the time-of-sowing trial.

Seed Control

In the past large areas of nassella have been treated with relatively low rates of TCA and dalapon to prevent formation of seed. Some research was done into the rate of herbicide required and the possible effect of the treatment on the tolerance of nassella plants to subsequent applications intended to kill.

However, the practice of spraying for seed control only has been dropped from the nassella board's programme so that all resources can be directed toward killing the tussocks themselves.

Large-scale Trial

A 90-acre block of mature nassella at Waiau was sprayed from the air in January with dalapon at 30 lb per acre. Two months later seed and fertiliser were aerially sown, the clover seed over portion of the block being pelleted with lime.

Growing conditions were good during autumn and establishment of sown species was excellent. Seed distribution from the air was, however, very uneven and in August fertiliser was applied, principally to include additional seed. In this way the unevenness was partly reduced.

Some tussock has regrown and is being treated. Results so far, though, have been most pleasing, the density and vigour of the sown pasture species being notable.

No benefit from the pelleting of clover seed has been observed.

Apart from the favourable weather conditions after sowing, a major factor in the successful establishment of oversown seed was, no doubt, the ground cover of litter provided by the dead nassella. This formed an ideal seedbed for aerial sowing and emphasises the advantage of sowing within a few months of spraying the nassella for a kill.

Recent Trials

Several other experiments are under way, but are too recent yet to have yielded results. They include investigations into:

1. The effects of various chemicals on the viability of nassella seed.

2. The problem of nassella seed in the soil.

3. Dalapon applied from the air in variable rates of water.

4. Rates of fertiliser in establishing and maintaining pasture after the destruction of existing nassella.

5. Various rates of water and dalapon on mature and regrowth tussock.

6. Comparison of dalapon applied as dust and spray.

7. Use of additional surface active agents with dalapon.

8. The effect of pre-burning on the tolerance of nassella to dalapon.

9. The effect of burning (loss of litter) on pasture establishment by oversowing.

10. Testing of new herbicides, for example, esters of dalapon.

11. Testing of various strains of *Phalaris tuberosa* for use in oversowing.

12. The control of nassella seedlings on sown pasture.

Acknowledgment

The author is indebted to a colleague, T. J. Smallridge, for assistance in the work described

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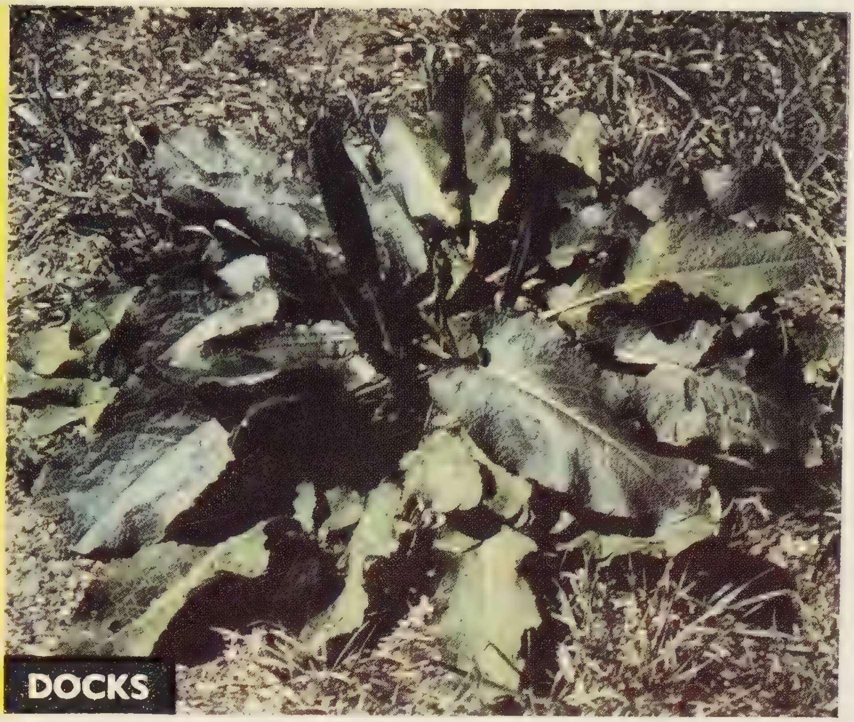
WEED IDENTIFICATION AND CONTROL

By L. J. MATTHEWS,
Principal Scientific Officer,
Department of Agriculture,
Wellington

This is one of a series of articles illustrated in colour to appear in the "Journal" from time to time in which identification and control of various weeds will be discussed.



DOCKS

DOCKS (*Rumex* species) are the type genus of the widespread family *Polygonaceae*, which contains many weeds such as sorrel, willow weed, cornbind, and wireweed. Four species of docks are troublesome as weeds in New Zealand. Broad-leaved dock (*R. obtusifolius*) is a perennial 2 to 3 ft high; the flowers are green tinged and the stems are stout and furrowed; the leaves are stalked, large, and heart shaped, the upper leaves being smaller and more spear shaped. It is possibly the most common species. Curled dock (*R. crispus*) has narrower leaves with very wavy margins. Fiddle dock (*R. pulcher*) leaves are narrowed at the base in the shape of the body of a violin. Clustered dock (*R. conglomeratus*) has spear-shaped leaves. Hybrids are also common.

DOCKS are common throughout high-producing dairy pastures, horse pastures, and cultivated areas. If the fertility is high enough, they also occur in waste areas. In dairy pastures docks have increased with the very practices aimed at improving production. They are also troublesome in lucerne stands and perennial crops such as asparagus.

Docks are prolific seeders and the seed undoubtedly remains viable for a long time in the soil. Furthermore docks produce dormant seeds, which ensures that germination takes place over long periods. Established docks are not killed by normal cultivation but resprout from their strong tap roots. After cultivation both seedlings and regrowth docks may appear densely, as dock seed populations reach 25 to 50 million per acre.

Control

Seedling docks and germinating seedlings are killed effectively by a number of herbicides. Established docks are difficult to kill with herbicides and cannot be controlled selectively.

Regrowth from small chips of dock roots after rotary hoeing or through discing may also be controlled selectively by a number of herbicides. Docks should, wherever possible, be controlled as seedlings or before they become strongly established.

In newly establishing pastures as soon as there is complete ground cover of pasture and weeds 2,4-DB should be applied at 1 to 1½ lb acid equivalent per acre. If red clover is the dominant clover, MCPB should be used at the same rate. MCPB is slightly less toxic than 2,4-DB to docks. In lucerne 2,4-DB should be used once the lucerne has one to two leaves at 1 to 1½ lb acid equivalent per acre.

In pea crops seedling docks are controlled with MCPB at 1 lb acid equivalent per acre. In cereals (not oats) the amine salt of 2,4-D at 1 to 1½ lb acid equivalent per acre is satisfactory if applied after the six-leaf stage. Normally, better control is obtained with MCPB applied after the one-leaf stage. For oats MCPA should be applied after the one-leaf stage. Usually curled dock is more susceptible to the above preparations than broad-leaved dock. Fiddle dock is the most difficult species to control.

Docks may be controlled by a number of pre-emergence herbicides. For maize simazine and atrazine or mixtures of these two applied at pre-emergence at 3 lb per acre are satisfactory. In crops such as carrots, onions, and strawberries where CIPC may be used temporary control is obtained with up to 4 lb per acre. Amiben also appears promising for carrots. On asparagus beds in soils where compaction is not a factor diuron or simazine at 4 lb per acre both adequately control seedling docks.

Established plants cannot be controlled selectively, but in pastures the development of a boom capable of spot application opens up new possibilities. Chemicals that show promise for spot application are 2,3,6-TBA, heavy rates of the amine salt of 2,4-D, and possibly MH.

Docks may also be removed by spudding (cutting the root off 2 to 3 in. below ground level with a sharp knife or similar instrument).

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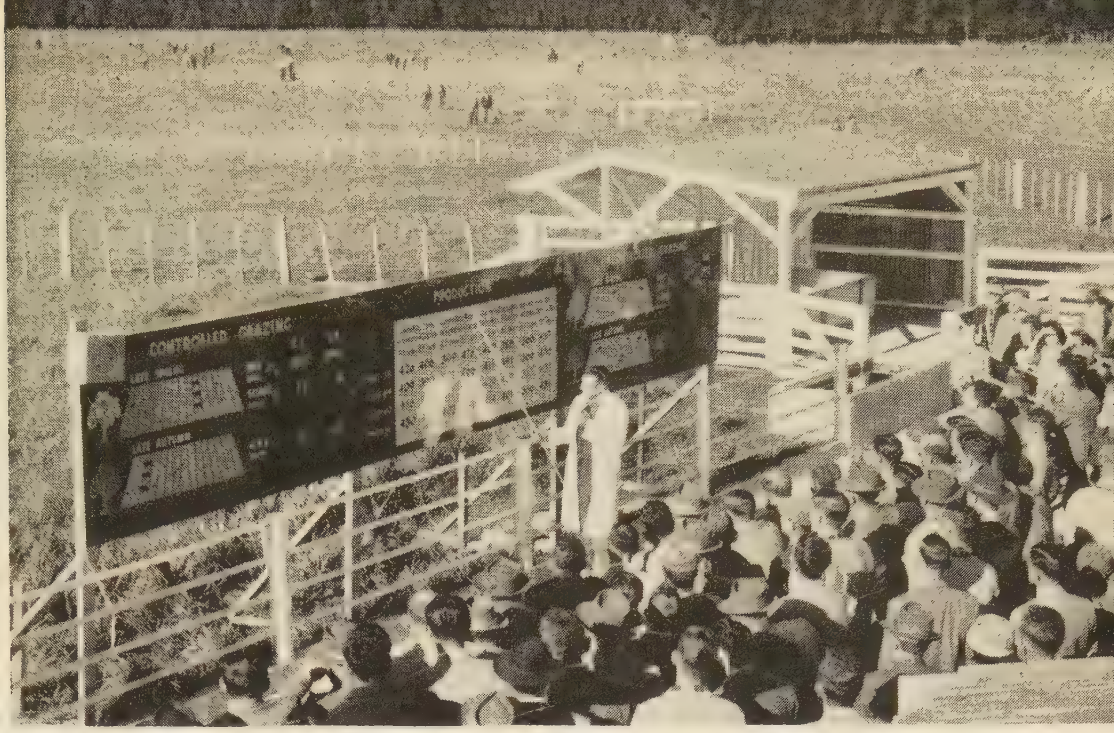
The Ruakura Farmers' Conference Field Day



▲ Farmers inspecting No. 2 Dairy at Ruakura at the field day last year. In the background are some of the visitors returning from their inspection of the farm.

New Zealand's Greatest Farm Meeting

By J. C. GERRING,
Animal Research Extension Officer,
Ruakura Animal Research Station,
and
J. D. J. SCOTT,
Advisory Officer
(Animal Husbandry),
Wellington,
both of the Department of Agriculture

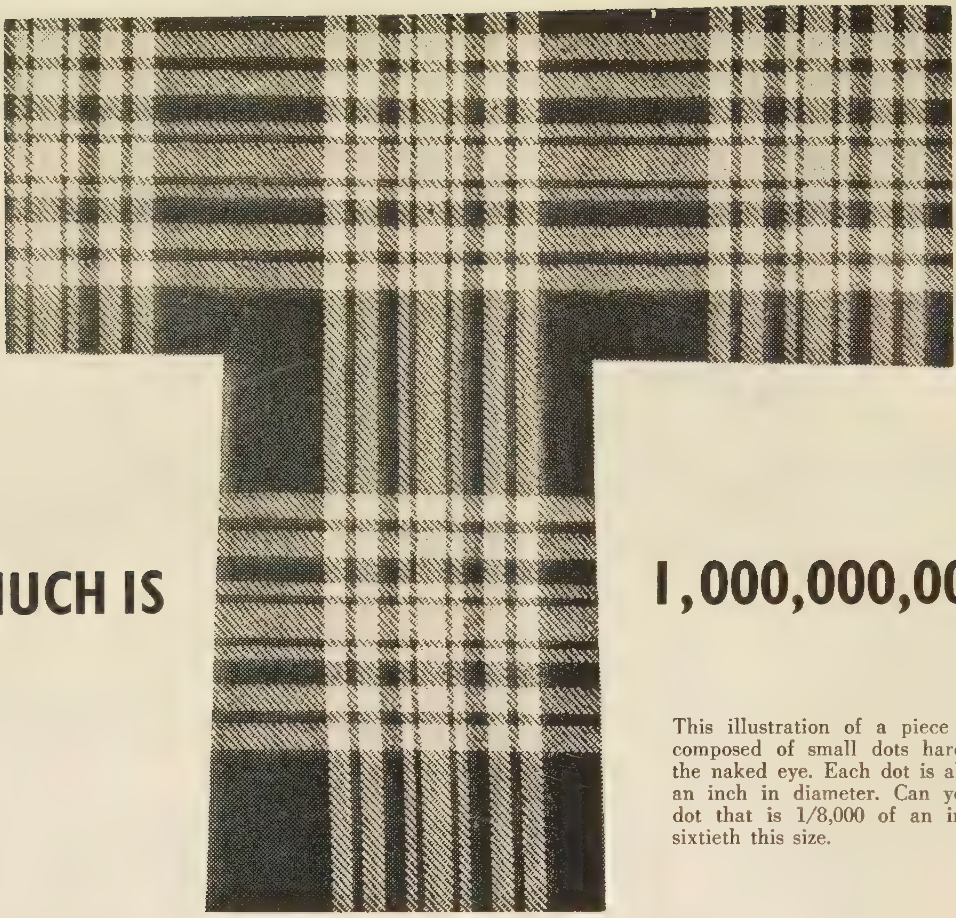
THE greatest annual meeting of farmers and research and extension workers in New Zealand is the Ruakura Farmers' Conference Field Day to be held at Ruakura Station this year on 14 June, during the Conference which is from 13 to 16 June. At the field day between four and five thousand people view, examine, and discuss the exhibits, which demonstrate the work of Ruakura Animal Research Station and other organisations.

AT last year's field day a survey was made of the type of exhibit preferred by those attending and several suggestions resulting from it will be incorporated in this year's field day. All who helped in conducting the survey are thanked, particularly farmers who willingly provided information.

The survey showed:

1. The crowd of about 4,500 was representative of all provinces of New Zealand, plus a few farmers from overseas. Most came from Waikato and lower Raglan County areas, comprising 45 per cent of the attendance. Northland (10 per cent), Bay of Plenty (8 per cent), and South Auckland (7 per cent) were the next best represented areas.
2. Of the visitors 44 per cent were attending for the first time, 15 per cent for the second, and 41 per cent for at least the third time. A few had attended every one of the previous 10 field days.
3. Dairy farmers and those employed on dairy farms predominated among the visitors. They made up about 63 per cent of the total. It was encouraging to see that about one-quarter of the dairymen were sharemilkers. Sheep farmers, both fat lamb and hill country, were represented to about 20 per cent of the total, mixed sheep and dairy farmers 10 per cent, and non-farming visitors 7 per cent. Farm employees comprised 16 per cent of the visitors.
4. As by far the greatest group of visitors were Waikato dairy farmers, it is perhaps instructive to see how their production at home compared with the average. From figures supplied by those attending, the average herd size on straight dairy farms was 96 cows and the average farm 131 acres: this is equivalent to a stocking rate of 73 cows on 100 acres. Production per cow was 298 lb of butterfat (factory returns) and per acre 225 lb of butterfat.

   The average per cow production in the corresponding area was about 280 lb of butterfat in the same season. No district per acre figures are available, but on average they would certainly be lower than 225 lb of butterfat. It is not necessarily suggested that the production of these visiting farmers is higher than average because they have attended field days, but at least it can be definitely stated that those who don't attend can't claim that they have no need to do so because they are already producing well above average.
5. Perhaps, though, attendance at Ruakura field days does result in some benefits to production. Those local farmers who had attended previous field days outproduced those who were attending for the first time by 7 lb of butterfat per cow, 6 lb per acre, and about 800 lb per farm.



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6. The 1,500-odd local farmers and sharemilkers who attended provided a representation from their districts of about 1 in 7. Looked at this way attendance at the field day is not so spectacular since all the local districts considered are within one hour's drive of Hamilton. Despite the comment by Dr C. P. McMeekan, Director at Ruakura, that five people per acre is a high stocking rate, there is room for many more. This year's field day should be right up to previous standards.

At the last two conferences a number of farm walks round some of the experimental areas at Ruakura have been featured. These have proved popular. Farmers have been able to make a leisurely and detailed inspection of the pastures and stock. This aspect is to be extended this year.

Since the last conference two areas adjacent to the station have been acquired to replace a block which has been taken over for the establishment of a University and a Teachers' Training College. Both of these new areas will be included in the field day circuit. An inspection at this early formative stage will show the long-term planning in layout and buildings necessary for research studies.

Since the last conference, too, the New Zealand Meat Research Institute laboratories have been completed. They were officially opened on 4 March this year. Farmers will have an opportunity of looking through this very fine building and of seeing some of the specialised studies being made on the processing of meat. A display illustrating modern trends in the meat industry will be arranged.

The following will be some of Ruakura's specific exhibits:

500 Ewes on 50 Acres

For a further study of the forward creep grazing of lambs Dr L. R. Wallace, Senior Principal Scientific Officer at Ruakura, is at present wintering 500 ewes on his 50-acre block of consolidated peat. It will be interesting to see the condition of the ewes and the feed available on this unit at this year's conference.

Milking Beef Cows

On one of the newly acquired units Miss D. K. Walker has started a series of investigations on factors affecting the growth rate of beef calves. She has set out to measure the milk producing ability of different breeds and crosses of beef cows. At the same time observations are being made on the suckling behaviour of calves run under normal farming conditions.

Tupping

The management of rams has been investigated from several different aspects in recent years. Wallaceville Animal Research Station has developed a vaccine which protects rams against brucellosis, Ruakura has evolved an accurate method of assessing fertility and has studied the mating behaviour of sheep on both lowland and hill country, the Ashburton Veterinary Club has conducted trials on the percentage of rams required, and Massey Agricultural College has looked at the effect of joining rams at different times. Further trials are now being conducted at Ruakura to see if the time of joining the rams influences the onset of the breeding season in ewes. Dr D. G. Edgar, Veterinary Research Officer at Ruakura, is planning a demonstration which will bring together all the available information on these important practical issues.

Mating Behaviour of Lambs

Does the mating behaviour of lambs give any indication of their subsequent breeding performance? Dr Wallace has been keeping records in a straight Romney flock and will be discussing his findings on the field day.

Facial Eczema

The discovery just over three years ago of the fungus responsible for facial eczema has done little to solve the problem of controlling the disease. Ways have still to be found of either decreasing the effects of the toxin within the animal or of reducing the amounts which it consumes.

Nevertheless steady progress has been made, and some of the perplexing anomalies in the occurrence of this disease in the field can now be explained. In addition, changes have been found to occur in certain constituents of the blood of affected sheep. These changes may well serve as useful diagnostic aids which can be applied to the living animal. Farmers will be brought up to date with the progress made in this important field.

1961 Programme

Section for Sheep Farmers

(Tuesday 13 June)

"Talking about Tupping" (D. G. Edgar): "The Influence of Liveweight and Condition on Ewe Fertility" (L. R. Wallace); "Progress in Facial Eczema Research" (C. P. McMeekan); "The Cotted Fleece" (J. P. Joyce); "Multiple Shearing": "Field Practice" (C. P. Tebb), "Research Findings" (G. C. Everitt), "The Trade Viewpoint" (H. F. W. Brown); "Common Diseases of N.Z. Farm Dogs" (D. O. Cordes).

Evening: Symposium on Beef Production: "The Case for Increasing Beef Production" (R. H. Bevin), "Some Developments in the Production and Marketing of Beef and Veal" (G. C. Everitt).

Section for all Farmers

(Wednesday 14 June)

Field day.

Evening: "Question Time" (C. P. McMeekan in the chair).

Section for all Farmers

(Thursday 15 June)

(Chairman: I. L. Elliott)

"Selenium Deficiency" (W. J. Hartley); "The Control of Weeds in Crops, Pastures, and Drains" (F. B. Thompson); "The Control of Insects Affecting Pastures" (J. E. Bell); "Pasture Establishment" (P. D. Sears); "The Maintenance of Pasture Production" (J. Karlovsky); "The Influence of the Animal on Soil Fertility" (H. G. Hopewell and D. E. Hogg).

Evening: Symposium on "The European Common Market": "The United Kingdom Viewpoint" (J. Eaton), "A New Zealand Viewpoint" (M. F. L. Prichard).

Section for Dairy Farmers

(Friday 16 June)

"Progress in Bloat Research" (A. T. Johns); "The Importance of Stocking Rate" (C. P. McMeekan); "Dairy Farm Management" (J. D. J. Scott); "The Organisation of Silage Making" (J. Doutre); "Farm Management on Wet Soils" (D. G. Bowler); New Slants On: "Measuring Milk Yield" (D. S. M. Phillips), "Producing Beef from Dairy Farms" (J. C. Gerring), "Feeding Calves" (O. F. Parker).

A New Milking Machine

Mr D. S. M. Phillips, Senior Principal Scientific Officer at Ruakura, has made arrangements to display a new version of the Ruakura milking machine, which will be installed in No. 1 Dairy. The machine is a combination of the original Ruakura plant and an Australian one which has been developed under technical supervision from Ruakura. Innovations incorporated in this machine include a simpler pneumatic pulsator system, a circulation washing device, and a built-in testing mechanism which enables the farmer himself to check and adjust both the airflow in the machine and the operation of the pulsators.

The Ruakura Milk Meter

At this same centre a production prototype of the Ruakura milk meter, which has been under test at No. 1 Dairy for the past two seasons, will be displayed for the first time. This has been developed to enable farmers to record the production of individual cows without the use of buckets. The volume is recorded by this meter, as the milk flows from the cow. In the future this will dispense with the need for buckets in herd testing.

Grazing Management and Stocking

Dr McMeekan's experiment at No. 2 Dairy on grazing management and stocking rate never fails to hold the interest of farmers. This may be its final year. In spite of the less favourable season it is expected that the controlled grazed heavily stocked herd will again produce close to 500 lb of butterfat per acre.

Farm Advisory Service

These are a few of the demonstrations at this year's field day, in the staging of which the Farm Advisory Division will be cooperating with Ruakura staff. Farm advisory officers have also undertaken to discuss with farmers on their own farms later any of the techniques of management exhibited at Ruakura. A farmer attending the field day will merely have to leave his name and address and any subject can be further discussed at home.

Improved Application of Agricultural Knowledge

Aim of New Appointment

MR R. C. STUART, Farm Advisory Officer (Economics), Department of Agriculture, Christchurch, has been appointed to the new position of Superintendent, Agricultural Information, in the Department of Agriculture. He will be stationed in Wellington, but his new duties will entail liaison with research, information, and advisory officers of the Department throughout the country.

Mr Stuart.

The appointment has been made as part of the Department's policy of continually improving its information services to farmers. Agricultural knowledge has been widened enormously in New Zealand in recent years as a result of information gained from long-term investigations at research stations and through the improvement and increase of field experiments.

Substantial increases in production and improvement in farm management and animal husbandry efficiency have been attained by the most progressive farmers applying the information available from extension services. But much more could be achieved if all existing knowledge were put into effect by every farmer in New Zealand. Bridging the gap between the most advanced knowledge and the practice of the ordinary farmer is the aim of this new appointment.

Mr Stuart's wide experience in agricultural economics will enable him to bring specialised knowledge to the assistance of existing field services in finding the best ways of applying known techniques in particular areas and in presenting them so that farmers can fully appreciate their value.

He will also provide liaison between research and experimental workers and information services for the incorporation in recommendations to farmers of the results of any new research as they become available.

Meteorological Records for March

Station	Height of station above M.S.L. (ft)	Air temperatures in degrees (Fahrenheit)				Rainfall in inches					Bright sunshine hours
		Approx. mean	Difference from normal	Absolute maximum and minimum		Total fall	No. of days of rain	Difference from normal	Maximum fall		
				Maximum	Minimum				Amount	Date	
Kerikeri	240	63.9	+0.1	80.1	44.1	1.86	12	—1.7	0.64	23	170
Auckland	160	65.0	+0.1	78.1	49.0	2.08	14	—0.7	0.57	24	208
Tauranga	12	63.2	+0.6	77.0	41.5	2.55	10	—1.2	0.96	24	224
Ruakura	131	61.1	—0.1	80.5	35.9	1.32	10	—1.6	0.81	5	202
Whakarewarewa	1,006	59.9	+0.2	79.5	37.3	6.33	7	+2.8	2.92	24	203
Gisborne	14	62.4	+0.4	81.3	36.8	2.82	11	—0.2	2.04	7	209
New Plymouth	160	60.6	—0.4	75.4	42.2	3.82	9	+0.1	1.58	5	175
Karioi	2,125	54.2	—0.9	72.4	32.0	2.08	14	—0.5	0.48	12	—
Napier	5	62.6	+0.2	82.1	38.8	1.31	7	—0.9	0.59	7	218
Wanganui	72	60.4	—1.2	76.8	45.0	2.37	9	+0.2	1.43	12	161
Palmerston North	110	59.7	—0.6	79.0	39.9	3.49	13	+1.1	0.77	24	143
Waingawa	340	58.2	—0.8	79.2	36.0	2.68	12	+0.5	0.89	12	161
Wellington	415	58.2	+1.2	73.4	45.3	5.12	12	+2.0	1.12	12	170
Nelson airfield	5	58.8	+0.4	75.0	39.8	3.70	7	+1.1	1.65	5	220
Blenheim	14	59.2	—0.7	83.8	37.8	2.74	11	+1.1	0.84	23	213
Hanmer Forest	1,270	54.2	—2.0	79.0	33.5	2.39	12	—0.9	0.69	10	156
Hokitika South	15	56.1	—0.2	77.2	36.9	12.01	15	+3.6	4.75	5	165
Christchurch	22	56.6	—1.5	85.1	35.4	1.40	10	—0.3	0.47	5	145
Ashburton	323	55.9	—1.9	84.4	33.8	1.91	11	—0.2	0.52	5	146
Timaru	56	56.0	—1.4	82.9	36.5	1.87	10	+0.1	0.67	5	131
Alexandra	520	55.4	—2.2	80.0	33.0	2.11	6	+0.8	0.81	5	188
Taieri	80	54.1	—1.1	78.5	35.9	3.15	14	+0.7	0.63	5	123
Invercargill airfield	0	52.5	—0.7	76.0	36.1	3.75	19	—0.5	0.72	9	129
Chatham Island	150	55.6	—0.8	67.4	39.0	4.35	21	+1.8	1.62	8	132

Dairy Produce Graded for Export

THE following figures showing quantities of dairy produce graded for export during February 1961 and for the seven months ended 28 February 1961 with comparative figures for the same month and the seven months of 1959-60 have been compiled by the Dairy Division of the Department of Agriculture from figures supplied by divisional officers at the various grading ports:

BUTTER

Period	Creamery (tons)	Whey (tons)	Total (tons)	Percentage increase
February 1961	16,591	321	16,912	—
February 1960	14,647	295	14,942	—
Increase	+1,944	+26	+1,970	+13.184
7 months ended 28/2/61	139,277	2,463	141,740	—
7 months ended 29/2/60	133,614	2,359	135,973	—
Increase	+5,663	+104	+5,767	+4.241

Butter in store at 28 February 1961 was 42,142 tons

CHEESE

Period	White (tons)	Coloured (tons)	Total (tons)	Percentage increase
February 1961	7,516	1,501	9,017	—
February 1960	7,937	780	8,717	—
Increase or decrease	—421	+721	+300	+3.441
7 months ended 28/2/61	62,796	8,068	70,864	—
7 months ended 29/2/60	60,813	8,050	68,863	—
Increase	+1,983	+18	+2,001	+2.906

Cheese in store at 28 February 1961 was 25,543 tons

If these figures are converted into butterfat equivalent, there is an increase of 3.985 per cent in butterfat graded for the seven months as compared with the preceding season. The above figures refer only to butter and cheese graded for export and do not include butter and cheese used on the local market and other products such as anhydrous milk fat, whole milk powder, and other whole milk products, and are not necessarily a true indication of production trends.

Itch Mite Infestation of Fine-wool Sheep in South Canterbury

By M. C. ARMSTRONG,
Veterinarian,
Department of Agriculture,
Timaru

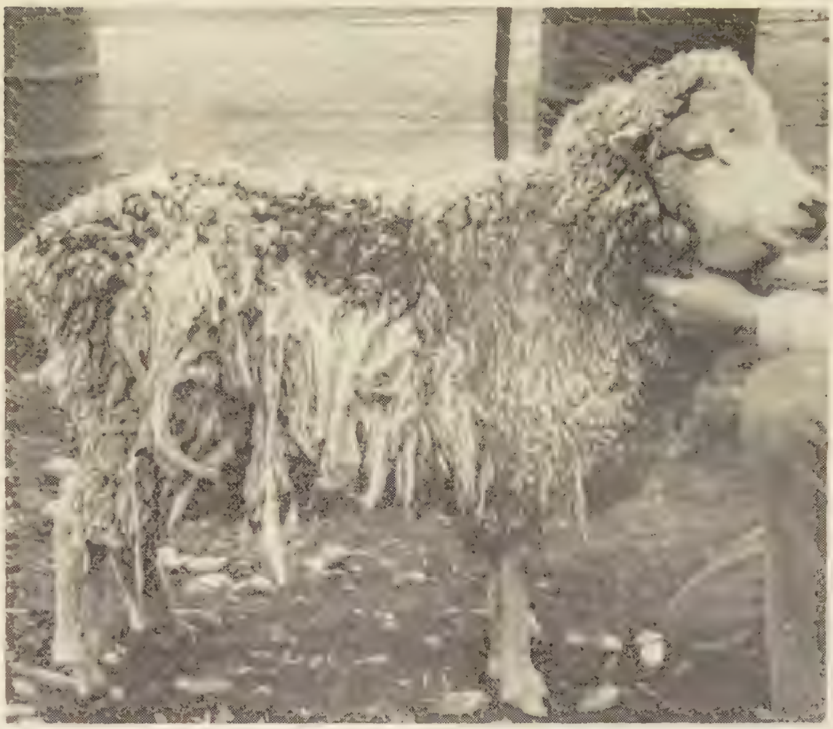
ITCH mite infestation has now been diagnosed in most Merino flocks and in some half-bred and Corriedale flocks in South Canterbury. It has been confirmed in the flocks by collecting skin scrapings of affected sheep and mounting them on slides for microscopic examination, when presence of the parasites has been revealed.

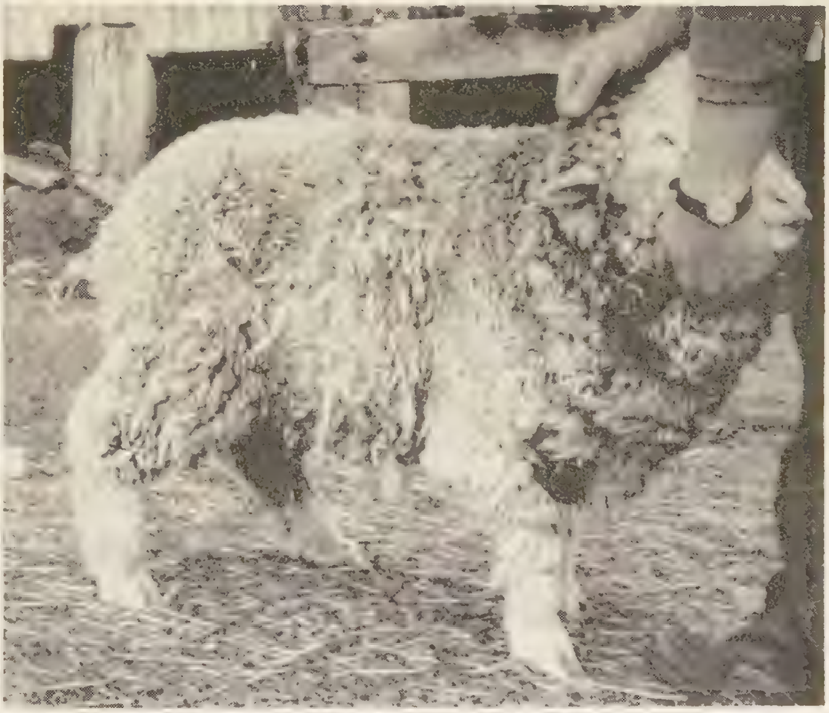
ITCH mite is a typical mange mite with rounded body, eight powerful legs with double claws, and a wide, closely attached head. It damages the surface of the skin, leaving discolouration, scurf, and sticky debris in the wool, and it causes shedding or loss of small tassels of wool.

Merinos appear to be more easily infested than half-breds and stronger-wool breeds. Where half-breds and Merinos are running on the same properties the infestation is much greater in the Merinos. Perhaps the fine tender skin of the Merino may be preferred by the parasite. The mites affect sheep of all ages, but the highest incidence in a flock is often in 2-tooth sheep.

Life Cycle

Though the life cycle of itch mite is not completely understood, there appear to be six stages of development, from egg to adult, over about six weeks during the active breeding season. The sexes can be readily identified and probably breed during autumn and winter, because in June, July, and August the developing nymphs are commonly found in skin scrapings. The mites are very difficult to find in late summer and only young larvae may exist in the skin at this period. Diagnosis of itch mite in sheep flocks was difficult to confirm during January, February, and March.





UPPER—An advanced case of → itch mite, showing severe wool-pull damage to the fleece. LOWER—A typical case of itch mite in a Merino.

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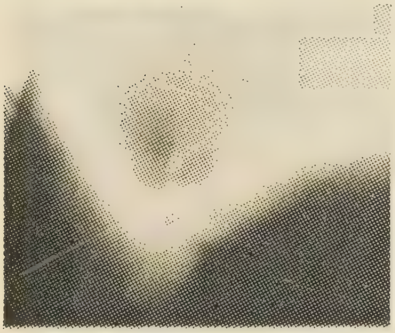
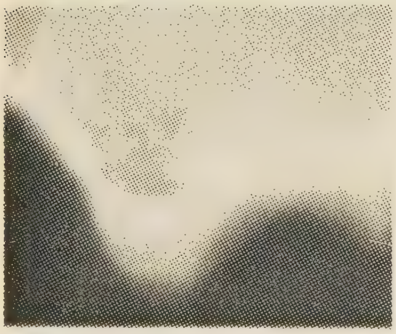
Now for the first time X-rays show you the difference between:

OINTMENT-TYPE TREATMENT



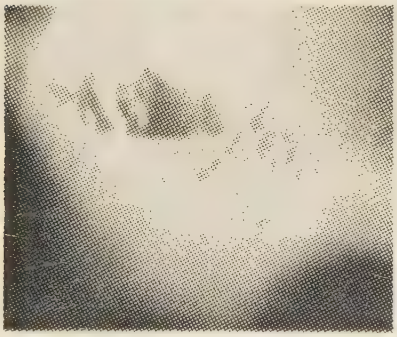
RIGHT AFTER TREATMENT

Some ointment is still stuck in teat canal.



1 HOUR LATER

Ointment balls up; antibiotic release delayed.

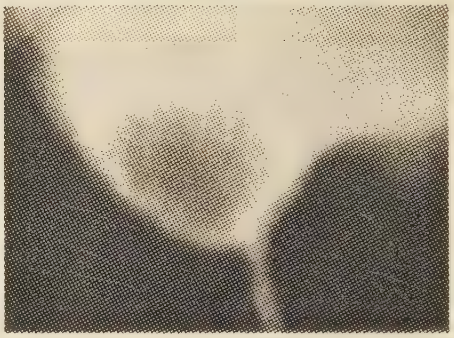


4 HOURS AFTER TREATMENT

Gobs of goo are still present in the udder.

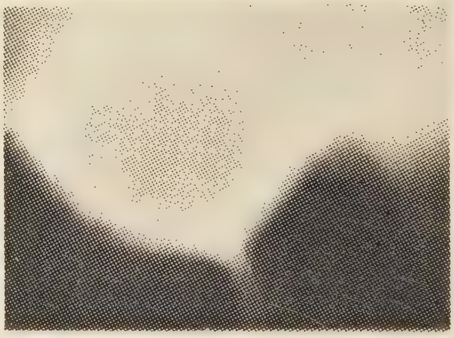
Only antibiotic particles clinging to the outside of the ointment globs are available to go into solution for fighting mastitis. Treatment is slowed down . . . and cows never have the benefit of full antibiotic release any time within a single milking period. Photos show that even up to 4 hours after treatment, ointment treatments are still in globs.

LIQUID TERRAMYCIN-TYPE FORMULA



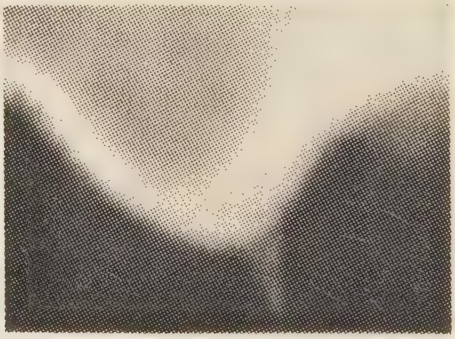
RIGHT AFTER TREATMENT

Liquid formula disperses fast after treating.



1 HOUR LATER

There's no holding back this preparation.



4 HOURS AFTER TREATMENT

There's a perfect mix throughout the quarter.

When liquid Terramycin is used, it mixes completely as milk is secreted and makes maximum contact throughout the milk-producing tissues. All of the Terramycin goes to work immediately . . . everywhere in the quarter where there is secreted milk. Then after it has done its work, it milks out completely within 72 hours.

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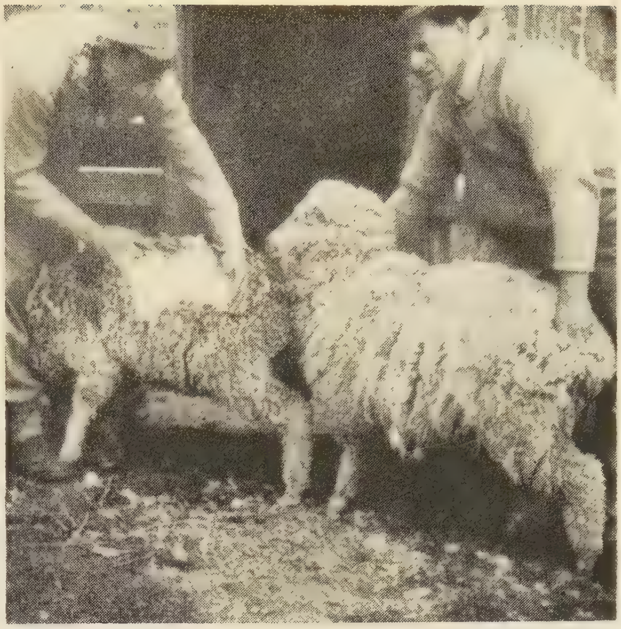

An area of positive skin scraping is shown in the sheep at left; the sheep at right exhibits severe damage to the fleece.

Symptoms Causing Loss

Itch mites cause chronic irritation of the skin and much damage to the fleece. The wool becomes matted and dark and the sheep are more difficult to shear because of partial cotting of the fleece. Areas of the fleece have a stringy tip often an inch or more in length on the wool staples.

The loose, stringy staples commonly appear first on the sides, flanks, or thighs. Some sheep chew and tear the wool on their flanks. In severely affected sheep the whole surface of the fleece is ragged, with loose tassels of tangled wool hanging from the sides and thighs.

The wool staple growing on the infested skin usually becomes stringy, has a pointed tip, and contains scattered, dry, crumbling scurf. The staple is often tender.

The skin itself may not appear greatly altered apart from an accumulation of scurf on the surface. In places the scurf may form a definite crust, but generally it is loose and crumbling.

The mite causes mild irritation of the skin, and very close observation of sheep at rest in the yards may be necessary to detect biting or rubbing. In some flocks there has been a great increase in sand and gravel in the fleeces and it is thought that itch mite irritation has caused increased rubbing under sandy ledges of creeks. Infestation spreads slowly in all directions and may take three years to spread all over the body.

Not Recently Introduced

Itch mites in New Zealand are considered to have long been associated with fine-wool sheep, but they are now assuming greater incidence and importance because of the failure of modern dipping chemicals to control them.

The itch mite *Psorergates ovis* was first diagnosed in Australia in 1941, but there is evidence that symptoms of infestations had been known in Australia for almost 40 years.

Circumstantial evidence shows that arsenical dips have kept the numbers of mite sufficiently low to prevent the infestations becoming serious without achieving total eradication.

Australian investigations showed that apart from a short period immediately after shearing, the transmission of mites from one woolly sheep to another was extremely slow.

In recent years, because of their efficiency against lice and keds, the chlorinated hydrocarbons such as BHC, dieldrin, and aldrin, and organophosphates such as diazinon have replaced arsenic as a dipping material.

However, BHC, dieldrin, aldrin, and diazinon do not appear to be effective in controlling itch mite and, as would be expected, increasing numbers of infestations are appearing. Though lime sulphur is the most effective material available to control itch mite infestations, its efficiency against other parasites such as lice, keds, and blowflies is low and the search continues for one material effective against all four parasites.

Control

Field trials by both the Commonwealth Scientific and Industrial Research Organisation and the New South Wales Department of Agriculture confirmed that a single plunge dipping with lime sulphur containing 1 per cent of polysulphide gave efficient control. Control was also achieved by showering with lime sulphur soon after shearing. Lime sulphur, however, requires the addition of other compounds to control lice, keds, and blowflies, and the total cost of materials is high.

Arsenical dips appear to give adequate control of itch mite infestations and rotenone can be added to control keds; or diazinon may be added to control keds, lice, and blowflies.

Arsenical liquids are by far the cheapest dips for economic control of itch mite, but it is very important to realise that the sheep require adequate wetting to the stage of skin saturation. This is best achieved by total immersion or plunge dipping.

If showers are to be used, the sheep must be done with not more than one month's growth of wool after shearing and pressures and times under the showers must be adequate for thorough skin wetting.

The short spray races which provide surface or tip spraying will not control itch mite no matter what insecticide is used at present.

Facts about Itch Mite and Its Control

- Itch mite (*Psorergates ovis*) is a tiny mange parasite which lives in the sheep's skin causing discomfort, irritation, skin damage, and loss of quality and quantity of wool. Early diagnosis and control are essential if severe loss of wool is to be avoided.
- Fine-wool sheep, especially Merino, are susceptible, and there is no evidence at present of infestation in strong-wool sheep such as Romney and crossbred. Positive diagnosis in South Canterbury is limited at present to Merino and its dominant crosses including some half-bred and Corriedale sheep.
- The use of arsenic and derris dip in the past has evidently kept the parasite at very low levels of infectivity without recognisable loss of wool value.
- Replacement of arsenic and derris by BHC, dieldrin, aldrin, and diazinon has failed to control itch mite even when these new insecticides are used in immersion dips and showers.
- Control can be readily achieved by reverting to arsenic dips, if thorough skin saturation is obtained by immersion or shower.
- Surface or tip spraying and dusting with any insecticide available at present will not control itch mite.

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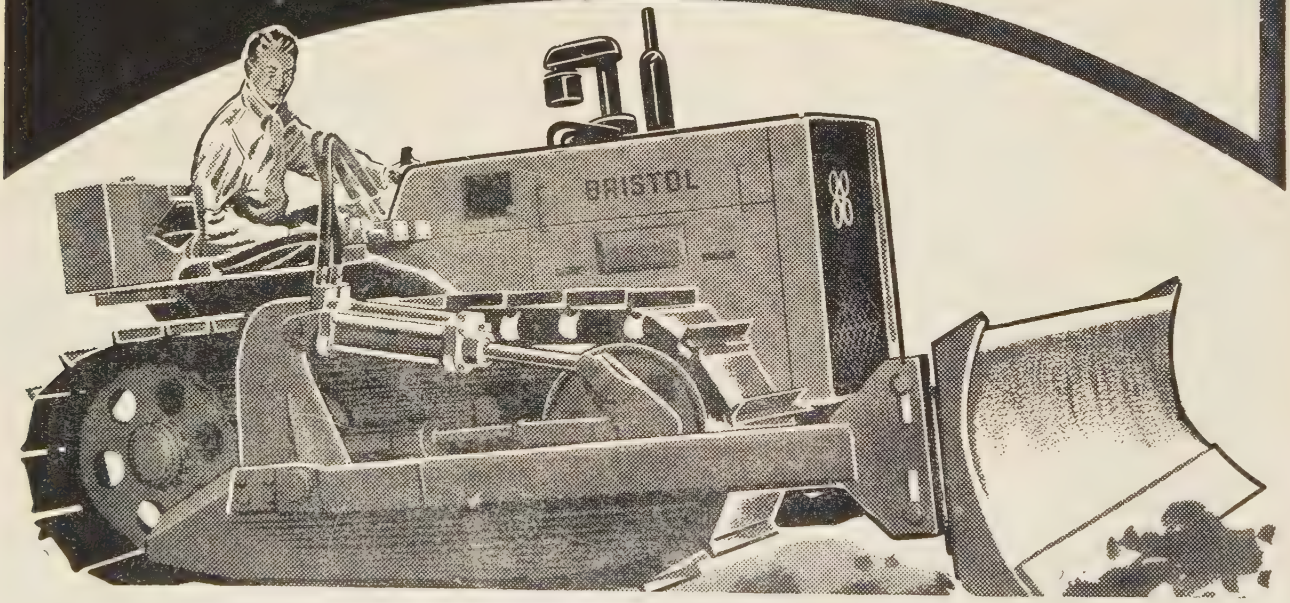

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North Island Sheep Stations

FEW sheep stations in New Zealand winter more than 20,000 sheep. Most of those in the North Island that do are in either Rangitikei County or Gisborne-East Coast area. This article describes three of these North Island stations, "Otairi" in the Hunterville district, "Wakarua" in the Taihape district, and "Huiarua" on the East Coast near Tokomaru Bay.

By A. A. DUNCAN,
Farm Advisory Officer,
Department of Agriculture,
Wanganui

"Otairi"

"OTAIRI" is in Rangitikei County 13 miles from the railhead at Hunterville and 37 miles north-east of Wanganui.

The station was taken up by Mr John Duncan between 1875 and 1880 and was farmed until recently by his son Sir Thomas Duncan. The present manager is Mr A. K. Scott.

The property is of about 11,000 acres, all of it steep to very steep hill country derived from sandstone and mudstone. The station is oblong and it is 10 miles as the crow flies from the homestead to the back of the station.

The elevation of the country ranges from 350 ft to 2,850 ft with most of the hilltops ranging from 1,200 to 1,400 ft. The only flat ground on the station is a few acres round the homestead, shepherds' quarters, woolshed, and yards; there are no flat or rolling paddocks.

Rain forest originally covered the area, the main trees on the front country near the homestead being kahikatea and rimu with some totara and kowhai. On the back country the bush was kaikawhaka, tawa, matai, rimu, and miro. A few patches of beech grew where the soil was predominantly derived from sandstone. Rainfall is well distributed throughout the year and usually totals about 45 to 50 in.

"Otairi" winters 27,000 sheep, of which 12,000 are breeding ewes, and about 37,000 sheep including lambs are shorn. The average wool count is 48/50. The property is divided into 20 main paddocks plus holding paddocks, the largest paddock being 1,056 acres.

There are two woolsheds on the property, the main shed at the homestead having 10 stands and a night-pen capacity of 5,000. The main shed has the wool table in the centre of the shearing board with five stands on either side of the table.

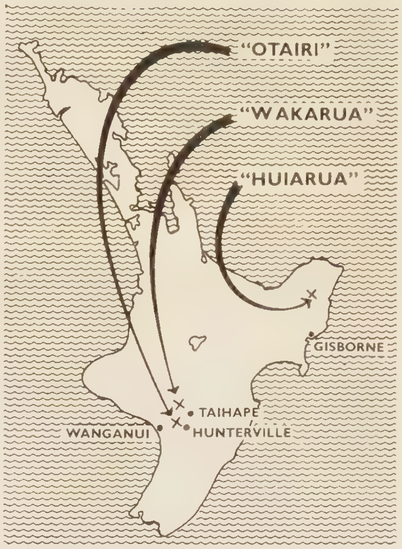
All 10 stands were previously operated from one electric motor, but now each set of five stands has a separate motor. This has reduced wear and tear on the plant and when small mobs are being shorn, only one set of stands is needed. The back woolshed is 8 miles from the homestead and has five stands and a night-pen capacity of 1,000. Access to this shed is by bulldozed track, which can take lorries in summer when the track is dry.

Sheep Management

Romney sheep are used and a Romney breeding flock is kept to breed replacements. In addition Southdown rams are run with about 2,000 cull ewes of the flock. Each year the cull two-tooths are put into this flock and are mated with Southdown rams until they are sold fat as cast-for-age six year olds.

The sheep management policy is predominantly one of set stocking. Extra wethers are bought in off the shears in spring to help utilise surplus spring growth, and fat sheep are sold in January after the spring flush. All the bought-in wethers and the wethers bred on the place are sold fat. Cast-for-age six-year-old ewes are also sold fat.

Cattle Management



All dry stock are run; no beef breeding cows are kept. About 3,000 bullocks are run in winter and 4,000 in summer. Yearling cattle are bought in spring and held until they are three and a half years old and sold fat from January onward after the spring flush of feed has been utilised. Most of the cattle are Aberdeen Angus with some Hereford and Aberdeen Angus/Hereford and Aberdeen Angus/Shorthorn cross.

The cattle are rotated around the paddocks to keep pastures in order for the sheep and to control fern and second growth. Paddocks are fenced so that the cattle can graze round and round an area rather than up and down one particular face. The aim is to have the cattle grazing along one side of the gully, around the gully head, and then back along the other side. This fencing layout results in the

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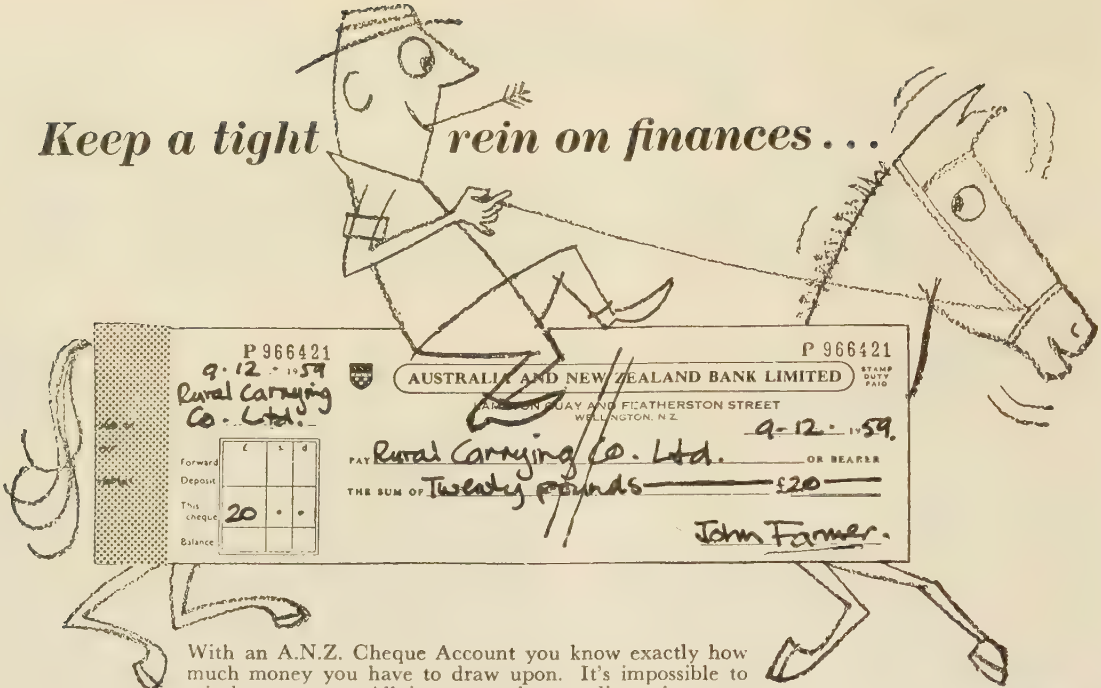

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The only flat ground on "Otairi" station is a few acres round the homestead, shepherds' quarters, woolshed, and yards.

cattle walking further and in doing so they are more efficient in tramping out fern and second growth.

The stocking rate of cattle in the paddocks that the hoggets are grazed in is heavy and this helps to keep the hoggets in good thrift. Only the tail-end hoggets are drenched with phenothiazine; the main mob of hoggets is not drenched.

General stock health is good. A problem is losses of sheep through their falling into underground watercourses. Cattle are mainly lost in falls over bluffs. They reach out over the bluffs to eat the flax growing on the sides and because the flax leaf is difficult to bite through, they pull on it and fall over the side.

Most of the paddocks are watered from permanent creeks, but where there are none dams are constructed with the bulldozer.

Some topdressing was done by pack-horse teams before 1939 and since 1952 aerial topdressing has been the practice. About 400 tons of superphosphate are now applied each year and basic slag has been used on some of the lower lying country. A block of paddocks is given a dressing of 2 cwt per acre of superphosphate two years in succession and then another series of paddocks is moved on to. There is a gap of about six years before any particular block is topdressed again. Mother white clover is oversown with superphosphate at 2 lb per acre for the first two dressings of superphosphate in each paddock.

Manuka is the main weed and is kept under control by scrub cutters. Manuka blight established to some extent about 1952, but the number of plants killed was very small. Ragwort, present in some paddocks, is controlled by sheep. Isolated gorse and variegated thistle plants are cut out as they appear.

With a permanent staff of 15 and a casual labour force of 20 there are about 35 on the station for most of the year. The shearing gang is kept going in the off season with fencing, scrub cutting, crutching, and other jobs.

Otairi school is 2 miles from the station. Electricity was connected about 1921; before this heating and lighting were by rock gas.

The bulldozer has been a big help in the management of "Otairi", facilitating the taking out of such things as fencing material and providing good access routes for stock and making mustering much easier and quicker.

▼ Except for a few acres, all the "Otairi" property is steep to very steep hill country.

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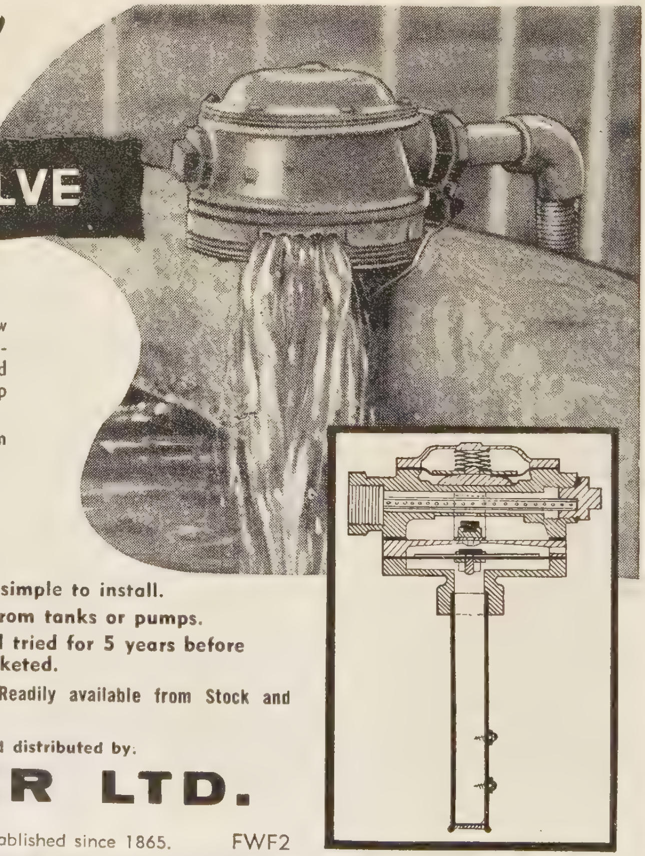


''Wakarua''

"Wakarua" is in the upper reaches of the Turakina River, 11 miles from Mataroa and 18 miles north west of Taihape. The station was taken up in 1896 by Mr Henry Collier and is now farmed in partnership by two brothers, Messrs A. R. and S. R. Collier. The station is of about 7,000 acres, consisting of hill country and a fair proportion of flat and giant discible rolling country. The country ranges from 1,500 to 2,200 ft above sea level and the original cover was matai, maire, kahikatea, rimu, and totara. The annual rainfall of 52 in. is fairly well distributed throughout the year.

The hill country soils are derived from calcareous mudstone commonly known as blue papa. The soil is classified by the Soil Survey Division as Turakina silt loam and has the number of 114 b on the North Island soil survey maps. Though there are other areas in New Zealand with the same classification it is from the Upper Turakina area in which "Wakarua" is situated that this type of soil takes its name. Turakina silt loam is one of the most fertile hill country soils in New Zealand.

Before aerial topdressing was started pastures consisted of crested dogstail, browntop, sweet vernal, and Yorkshire fog with perennial ryegrass, cocksfoot, and white clover well represented.

The station winters 14,000 breeding ewes and 6,500 other sheep and is divided into 42 main paddocks plus holding paddocks. The sheep are shorn in two 8-stand woolsheds, each shed having a night-pen capacity of 1,500. The woolsheds are at the extremities of the property and there is road access to each shed. The sheep are all of the Romney breed and have a wool count of 46/48. About 4,000 ewe hoggets are kept to maintain the flock, and surplus ewe hoggets are sold in autumn. All the wether hoggets are sold fat, according to the season. Cast-for-age five-year-old ewes are sold to low-country fat-lamb farmers in February.

"Wakarua" carries about 1,850 cattle (450 Hereford breeding cows and 1,400 other cattle). In drier seasons this number may be reduced slightly. Sufficient Hereford cows to maintain the herd are run with Hereford bulls and the remainder are run with Aberdeen Angus bulls. The best Hereford-bred heifers are picked out for herd replacement and the remainder of the Hereford heifers and all the Aberdeen Angus crossbred heifers are speyed. The speyed heifers keep the cattle numbers up on the property without recourse to buying in. They are easy to handle and fatten well and kill out at an average of 550 lb at three and a half years old. The bullocks are sold fat and forward at four and a half years old. Breeding cows are kept up to 10 years old and then sold as stores.

Until the late 1940s "Wakarua" had a light and a heavy horse stud, but the heavy stud has now given way to mechanical equipment, such as 4-wheel drive farm vehicles, wheel tractors, and a medium sized bulldozer. The light horse stud is still maintained to meet hack requirements and surplus horses are sold as three year olds.

About 60 acres of chou moellier or swedes are grown annually for winter supplementary feed, and after cropping the paddock is grassed down with certified perennial ryegrass (30 lb), white clover (2 lb), subterranean clover (2 lb), and cocksfoot (6 lb). About 10,000 bales of hay are made each year with the station's equipment for cattle feed in winter.

Aerial topdressing was started in 1949 and each year up to 200 tons of superphosphate are applied from the two airstrips on the property to about 2,000 acres. In addition 350 acres of rolling country are regularly topdressed with 3 cwt of superphosphate an acre. All the hill country has been aerially oversown since 1949 with 2 lb of certified mother white clover and 1 lb of subterranean clover.

The stock are watered from streams which do not dry up in summer and large retaining dams have been constructed in most paddocks to facilitate stock watering. During a dry season the station is a little pinched for water, but otherwise the supply is more than adequate. Water is gravity fed to one set of houses, woolshed, and yards and pumped from the Turakina River to the other.

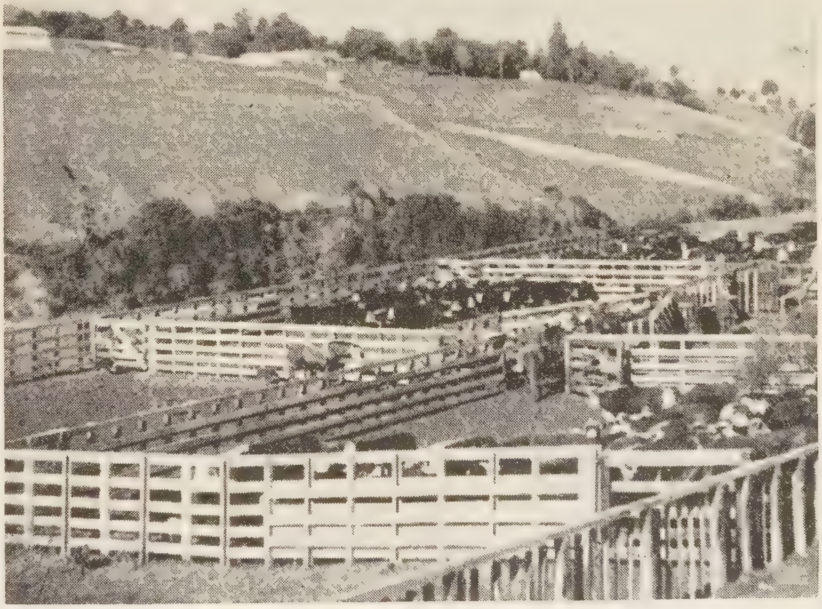
There is a permanent staff of 12 on the station and other temporary labour is engaged. There is a school 7 miles away at Owakura.

Sweet brier and gorse are the two most troublesome weeds on the station, but they are confined to isolated areas. They are now being ground sprayed each year with hormone sprays and are being gradually eliminated.

Some years ago some 30 acres of gorse were fenced off and planted with *Pinus radiata* and the trees are now ready for milling. The 20 acres of shelter belts consist mainly of *Pinus radiata*, eucalyptus, and *Cupressus macrocarpa*.

Soil erosion has occurred along an area of the Koukoupo stream and this has been fenced off and planted with poplars and willows and *Pinus radiata*. Apart from isolated instances erosion is not a problem.

Electric power was connected to the station in 1955; before that diesel generating sets were operated.



The cattle yards on "Wakarua" station. About 1,850 cattle are carried, though in dry seasons this number may be reduced.

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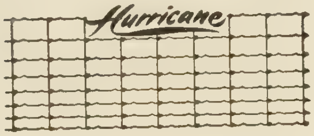

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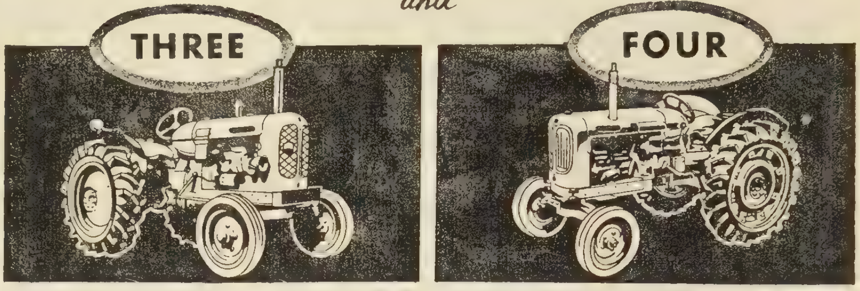

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“Huiarua”

[Kandid Kamera Kraft

Travelling mob of three-and-a-half-year-old bullocks from "Huiarua" station being watered.

“Huiarua” is 23 miles from Tokomaru Bay and 78 miles from the railhead at Gisborne. The station is owned by the Williams family and managed by Mr D. H. Johnstone.

The station was taken up by the Williams family in 1900 and was in native bush except for a small area in the front of the station. The bush consisted of rimu, matai, and totara with beech predominating in the more elevated back country. The last of the bush was cleared between 1925 and 1930.

“Huiarua” is a combination of huia (the native bird) and rua (two), for two prominent peaks which stood out above the bush in the early days. The ridges leading up to the two peaks were favourite places for huias and the locality came to be known by the Maoris as “Huiarua”.

The property is of 23,000 acres, most of which is hill country ranging from 1,000 ft to 4,650 ft (Mt. Arawhana).

The annual rainfall averages 62 in. and long-term average monthly Meteorological Service figures show that it is surprisingly well distributed for an East Coast district. The recordings were taken at “Huiarua” homestead, which is 1,100 ft above sea level.

January ..	4.6	July ..	6.5
February ..	4.2	August ..	6.4
March ..	4.6	September ..	5.1
April ..	5.2	October ..	5.1
May ..	6.9	November ..	4.0
June ..	6.0	December ..	3.3

The station winters 23,500 sheep of which 12,000 are breeding ewes, and about 33,000 sheep including lambs are shorn. There are 44 main paddocks plus holding paddocks and over 100 miles of fencing.

The woolshed has 14 shearing stands with a night-pen capacity of 3,000, which is sufficient for one day’s shearing. The shearing is done with a gang of 45.

Romney sheep are used and the average wool count is 48/50. Cast-for-age five-year-old ewes are sold to fat-lamb farmers, but no cull two-tooths are sold; about 2,500 of the tail-end two-tooths are run empty and wintered on the colder, elevated country. These two-tooths shear a very good clip and after shearing are culled in January, the tops going into the flock and the rest being sold to fat-lamb farmers. About 2,000 fat lambs are drafted each year and also about 3,000 fat two-tooth wethers are sent to the freezing works.

A herd of breeding cattle is run; no cattle are bought in. The station winters about 1,300 breeding cows and 2,500 other cattle, all of which are Aberdeen Angus. Breeding cows are kept until eight years old and then sold to either Waikato or Gisborne buyers for fattening. Steers are kept until three and a half years old and then sold in forward condition to buyers in the Auckland district, where they are topped off for the Auckland City meat market. Steers are kept until three and a half years old because the larger cattle are necessary to control the colder back country.

Cropping for winter feed was started three years ago. About 200 acres of Superlative swedes are grown annually on run-out country which can be cultivated with a crawler tractor and giant discs. Good crops of swedes have been obtained and have proved very useful for wintering hoggets when the back country is covered with snow. Three cwt of serpentine superphosphate per acre is sown with the swede crop and 3 cwt per acre sown with the new grass after the crop. The seeds mixture used for grassing down consists of certified strains of perennial ryegrass (20 lb), white clover (2 lb), subterranean clover (3 lb, made up equally of Tallarook and Mt. Barker), and cocksfoot (4 lb).

Aerial topdressing with superphosphate was begun in 1954 and since then about 150 tons of superphosphate have been applied annually. Oversowing with 3 lb of mother white clover and 2 lb of subterranean clover on hill country too steep to cultivate has been carried out in conjunction with topdressing. The country is given an initial dressing of 3 cwt of superphosphate and clover and this is followed up with a further dressing of 2 cwt of superphosphate the following autumn after the paddock has been shut up and allowed to seed. This method of improving hill country pastures has proved very successful.

Most of the paddocks are well watered from the Mata River, creeks, or permanent springs. Retaining dams have been constructed with the bulldozer in those paddocks that are not naturally well watered.

The labour force is usually from 20 to 25, including six shepherds and four permanent fencers. There are 10 houses, quarters for single men, and a school on the property. The provision of houses has resulted in a more stable labour force.

Soil erosion is a problem and there are large earth movements typical of those of other parts of the East Coast. Poplar plantations have been established to supply poles for gully control work. Willows have also been used in gully control work, but damage to willow poles by opossums is serious. There is very little manuka on the station and macrocarpa brush from shelter trees round the holding paddocks and houses has been used in the construction of debris dams.

There are no real weed problems. There are odd variegated thistle plants, but a man riding round can usually clean them up in a couple of days. Strathmore weed (*Pimelia prostrata*) has spread a little in a paddock that has been giant disced and sown down to new grass.

About 35 miles of internal roads have been constructed with the bulldozer and in summer there is vehicle access to practically all paddocks. This is a great asset in carting fencing material and is time saving, because the property is long and fairly narrow (15 miles long as the crow flies) and a tremendous amount of horse riding and pack horse work was previously necessary. Since the roads were put in, horses are kept about 6 miles out from the homestead and when stock work is required in that direction the shepherds take a vehicle out to where the horses are.

Care of Livestock during June

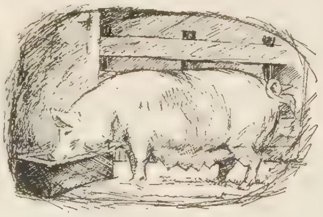
By Wallaceville and Ruakura Animal Research Stations

MOST FEED-CRITICAL PERIOD FOR DAIRY HERD

IN the early stages of lactation cows of good dairy merit are unable to eat sufficient pasture to meet their feed requirements. However, those carrying ample condition can make up this deficiency for a limited period by drawing on their body tissues. Most cows lose weight at this time. For these reasons it is important to have cows in reasonable condition at calving and to feed them fully over the first six weeks after calving. Cows managed in this way quickly reach their peak production, the height of which largely determines the season's yield.

To meet these feed-critical periods, both before and after calving, it is important to plan now to make the most effective use of available food supplies. For this it is useful to have some guide as to the amounts required. Though an acre of autumn-saved pasture represents a highly variable quantity of feed, Ruakura experience indicates that a dense, leafy, predominantly ryegrass-white clover pasture, some 8 to 9 in. high, will provide a daily ration for 110 to 120 dry in-calf cows. Dry Jersey cows fed this with no other supplementary feed will gain 4 to 5 lb per week in body weight.

To provide a full ration for milking cows and still get a reasonable clean-up, the same pasture should be fed at the rate of 1 acre per day for about 70 cows. Where supplies of autumn-saved pasture are limited it is advisable to keep this feed for after calving. Recent experiments at Ruakura show that for dry in-calf Jersey cows 70 to 80 lb of silage per cow per day is almost as good as autumn-saved pasture. In contrast, for milk production grass is the best feed available. Cows in milk and being fed to capacity can consume considerably more grass than either silage or hay.



PIG PRODUCTION

Sows must farrow in May, June, and July if their litters are to be large enough to consume the milk available in the peak months of October and November. Make preparations now to have warm accommodation ready for the May-born piglets at weaning. This will avoid losses, maintain growth, and save feed. Ruakura experience suggests that at weaning litters removed from the sow and placed in a warm, clean pen will settle down better than if left in their old quarters. Sows close to farrowing should be housed at night, but should be given access to young, leafy pasture in the daytime. Feed 3 to 4 lb of meal per day during the last fortnight before farrowing as a supplement to root crops or grass. Constipation, which commonly occurs at this time, can be avoided by feeding ½ lb of bran daily or 4 oz of molasses two or three times before farrowing. Sows suckling litters should be fed 4½ gallons of milk plus 1 gallon for each piglet suckled. Where milk is in short supply 1 lb of meal can be used as a substitute for each gallon of milk.

GOITRE IN LAMBS

Where pregnant ewes are wintered on swedes, turnips, rape, chou moellier, or kale for several weeks before lambing, goitre, sometimes accompanied by high death rates, may occur in their lambs. This can be prevented by giving the ewes extra iodine during the last two months before lambing.

If iodised salt licks are used, these should contain 5 oz of potassium **iodate** to the ton. However, it is better to dose the ewes with iodine contained in a drench. For this purpose potassium **iodide** is a safe and convenient compound because it dissolves easily in water. Sufficient drench for 160 doses is made by dissolving 1½ oz of potassium iodide in 1 gallon of water. Each ewe should receive a 1 fl. oz. dose of the resulting solution about two months before lambing and a second similar dose about one month before lambing.

BEEF HERDS ON HILL COUNTRY

Run cows which have been worked to a hard store condition since their calves were weaned should be lifted in condition toward the end of June. Pastures which have "got away" under lax grazing by hoggets are ideal for this purpose. Crops and hay, if available, may be rationed out to the cows. Alternatively, feeding out hay on dirty faces helps to crush unwanted growth through trampling and seeds such areas to pasture.

MANAGEMENT OF THE EWE FLOCK

Now is a good time to assess the supply of pasture likely to be available for lifting the level of feeding through the critical four to six weeks before lambing. Where this appears to be inadequate a number of practices can be adopted to help overcome a feed shortage. The thinner ewes can be drafted off periodically and given preferential treatment, while those in good condition can be held on a maintenance ration. Since the breeding season of Romney ewes extends to late July, the empty ewes still returning can be picked out by fitting a small percentage of rams with a commercially available raddling harness. In this way a high proportion of the 5 per cent of ewes normally dry can be disposed of. Cattle can, if necessary, be maintained on hay alone. In this way more grass can be made available for the ewes. Lastly the ewes themselves can be fed a supplement of hay.

LIVER FLUKE IN SHEEP

In areas where sheep become infested with liver fluke flocks should be drenched now. The only effective drug is carbon tetrachloride, which should be mixed with four times its volume of liquid paraffin. The dose of the mixture is 5 c.c. for sheep of all ages, and 1 gallon is enough for about 900 sheep. Further information about liver fluke in sheep and cattle will be found in Bulletin No. 248, "Live Fluke of Sheep and Cattle", which is available from the nearest office of the Department of Agriculture.

WORMS IN LAMBS AND CALVES

Worms are sometimes still troublesome in May and June, and if lambs or calves are not doing well, they should be drenched with fine-particle phenothiazine at the full dosage rates recommended by the manufacturers. Further information about worms and drenching will be found in Bulletins No. 171, "Internal Parasites of Sheep", and No. 189, "Control of Internal Parasites by Phenothiazine", which are obtainable from the nearest office of the Department.

Seasonal Notes

By Farm Advisory Division

TREE PLANTING FOR SHELTER

TREE planting for farm shelter should not be haphazard; each year's effort should be part of a planned programme aimed at ultimate provision of adequate and efficient protection for stock and crops. This entails siting of plantations and selection of species for the particular climate and soil. Extent of plantations must be related to the high cost of land they occupy, and, with present scarcity of labour, plantings that will entail much maintenance need to be avoided.

If possible, land should be cultivated before planting to ensure a better strike of young trees. Further cultivation during the first two years will encourage development of an effective wind-break.

The area to be planted should be fenced with permanent stock-proof fences before planting begins. Planting can be done from May until early August, preferably in dull weather. Roots of plants should not be allowed to dry out while planting is proceeding. Soil should be firmed thoroughly round newly planted trees. An ounce per square yard of DDT superphosphate should be scattered round each tree. —*C. P. WHATMAN, Ashburton*

* * *

MANAGEMENT OF NEW PASTURES

DURING the first six months' life of a new pasture aggressive species like ryegrass should be kept in check to allow the slower developing grasses and clovers to establish.

The first grazing should not take place before most plants have a firm enough hold on the soil to stand it, which is normally when they are 4 to 6 in. high. As new pastures lack the deep binding root systems of older ones, they are easily damaged by trampling and should not be grazed when the soil is too damp. Sheep or light cattle should be used for preference, but whichever type of stock is used, the first grazings should be with heavy concentrations for a short time.

If weeds which cannot be grazed out are hampering the development of the pasture, it should be topped. Weeds such as Californian thistle and docks, which survive topping, can be controlled by spraying with MCPB or 2,4-DB. If the area has been topped, spraying should be delayed until the weeds have grown some fresh leaf and are exposed after grazing. Otherwise, spraying should be done as soon as ground cover is complete, and in warm, fine weather expected to last at least another 24 hours.

—*S. H. HENRY, Stratford*

* * *

SUBDIVISION ELECTRICALLY

THE electric fence offers a cheap, easily erected, and effective method of subdivision for controlling most livestock grazing on either crop or pasture. In the May 1959 "Journal" an article "Electric Fences on Hill Country" describes how electric fences can be used for controlling sheep and cattle on typical North Island hill country.

For rationing crops and pasture to dairy cows, portable battery operated fence units are probably ideal; they have been well tried over the past decade. The newer mains operated electric fence units are now favoured and their capacity is up to 30 miles of well insulated wire. Apart from these commercially available battery and mains types there are home-made units, some using wind or water power to charge their storage batteries, while others have fractional h.p. electric motors coupled by belt to old magnetos to provide the high tension impulse. A great variety of insulators, such as discarded rubber tubing, plastic hose, and both plastic and porcelain moulded type insulators are used.

Porcelain insulators are usually the best, though possibly they are less durable than plastic.

At gateways the overhead wire system with a break link between gateposts is favoured, instead of burying insulated wire to by-pass current when the gateway link is opened. The number of wires and type (barbed or plain) charged depends mainly on the kind of stock being held or trained. Usually one or two electrified plain wires are sufficient, except for sheep, where more wires are needed, or pigs, where barbs can also be useful.

Supports for the wires vary from easily shifted metal press or drive-in steel stakes to the more permanent steel standards, or preservatised larch poles.

The directions for installing mains electric fence units should be read carefully before the work is started. The legal requirement is that a qualified electrician should do the job.

Lightning arresters are strongly recommended; they cost about 7s. 6d. each. Without an arrester a lightning strike may destroy the unit and there is also a risk to human life and property. —*D. M. E. MERRY, Pukekohe*

* * *

TOPDRESSING OF LUCERNE ON PUMICE COUNTRY

TOPDRESSING of lucerne on pumice country should err on the generous side. A stand of lucerne once established will respond to liberal amounts of fertilisers. Where heavy crops have been cut for silage or hay and fed out on other paddocks on the farm, the drain on the mineral reserves of the lucerne stand each year must be made good.

Time of application is important. Never topdress in late summer or early autumn. Lucerne quickly changes from growing vigorously to dormancy after continuous or severe frosts, and topdressing at this time is of no benefit, but can do harm by promoting the growth of competitive grasses and weeds.

The time to topdress lucerne is late winter or early spring just before early growth begins. The double boost of better growing conditions and ample readily available plant nutrients will encourage the lucerne to outgrow and smother invading annual grasses and weeds quickly, particularly where the initial cut is taken when the lucerne has reached the optimum height. Mixtures of lucerne with grasses such as cocksfoot and prairie grass also benefit from topdressing in the spring; a dressing then enables the lucerne to maintain a good balance with the associated grasses.

Where Italian or short-rotation ryegrass is being introduced into an open lucerne stand in autumn to provide greater bulk of material, it is better to use a drill for both the seed and fertiliser applied then than to broadcast.

Lucerne needs potash to be freely available and as pumice country is largely deficient in boron, it is essential to supply this element. Trial work is continuing to ascertain if other plant foods are required for optimum growth, but in the meantime the major requirements are phosphate, potash, and boron.

The topdressing recommended for lucerne in the pumice country is therefore a minimum of 3 cwt per acre of phosphate, 2 cwt per acre of muriate of potash, and 20 lb per acre of borax broadcast in late winter or early spring. —*R. W. MOODY, Rotorua*

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Town Supply Herds Certified Free of Reactors to Tuberculin Test

DURING February the following town milk suppliers were issued by the Department of Agriculture with clear herd certificates declaring that their herds are free of reactors to a tuberculin test.

To qualify for a clear herd certificate a supplier's herd must have no reactors to a tuberculin test of the whole herd. A herd comprises all cattle over six months of age depastured or kept on one property and includes dry or other stock from the property temporarily on a run-off. Where two or more herds share a common run-off all the herds using it have to be tested before any of them can qualify for clear herd certification.

In the list below the figures after each supplier's name and address are the number of animals tested and these are followed by the date of the test.

These herds will be recorded in the New Zealand Register of Clear Herds, compiled by the Department of Agriculture.

ADDY, C., Mangarino Rd., Te Kuiti, 99, 9/2/61
ALLEN, E. T., John St., Rangiora, 40, 20/2/61
ANDREWS, P. J., 1 R.D., Gisborne, 77, 19/2/61
APLIN, F. L., R.D., Brightwater, 29, 13/2/61
APPLEBY, E. F., Batty's Rd., Karaka, 92, 31/1/61
ARCUS, C. H., Foxton Rd., R.D., Levin, 92, 6/2/61
BALLANTYNE, D. G., Kennington, 58, 20/2/61
BALLANTYNE, D. M., 9 R.D., Invercargill, 34, 21/2/61
BARKER, J. W., Lower Styx Rd., Belfast, 39, 13/1/61
BELL, J. A. H., Box 425, Hamilton, 110, 2/2/61
BELL, J. A. H., Box 425, Hamilton, 253, 2/2/61
BERTRAM FARMLANDS LTD., P.O., Manakau, 219, 20/2/61
BIDDICK, F. A., R.D., Runciman, 63, 23/1/61
BLANCHE, D. J. and E. G., Motukarara, 2 R.D., Christchurch, 61, 6/2/61
BLANK, C. T., Lincoln, 4 R.D., Christchurch, 42, 20/2/61
BOOTH,, J. A., Maungatua, R.D., Outram, 48, 3/2/61
BRAY, K. T., Wheatstone Rd., Kaiti, Gisborne, 59, 26/2/61
BROOKS, C. W., 379 Halswell Rd., Halswell, Christchurch, 32, 3/2/61
BROWN, J. F., Greenpark, 4 R.D., Christchurch, 28, 23/1/61
CAIN, E. S., 467 Breezes Rd., Christchurch, 34, 17/2/61
CAITHNESS, G. R., R.D., Brightwater, Nelson, 34, 13/2/61
CAMERON, E., Lees Block, Te Kuiti, 36, 9/2/61
CANDY, A. E., Waerenga-a-hika, Gisborne, 37, 26/2/61
CLARKE, R. B., 5 R.D., Palmerston North, 79, 16/2/61
COCKS, A. M., Ashley Gorge Rd., Oxford, 27, 13/2/61
COMESKEY, J. F., Akatarawa, Upper Hutt, 89, 24/2/61
COULTER, W. J., Slacks Rd., Awapuni, 5, 21/2/61
COX, J. L., Est. of, Flaxton, Kaiapoi, Christchurch, 26, 20/2/61
CROAD, C., Main Rd., Portobello, 9, 2/2/61
CROSSWELL, L. H., 1 R.D., Invercargill, 19, 18/2/61
DAATSELAAR, G. A., Main Rd., Waikanae, 81, 21/2/61
DALE, J. H., Rerewhakaaitu, 3 R.D., Rotorua, 167, 28/2/61
DAVIE, R. F., Claremont, R.D., Timaru, 22, 27/2/61
DAVIS, A. K., Pakawau, Collingwood, 92, 6/2/61
DAWSON, F. H., Longbush, 1 R.D., Invercargill, 33, 17/2/61
DODDS, I. D., Main South Rd., Gore, 41, 27/1/61
DORNE, J. J., Tararua Rd., Levin, 35, 30/1/61
DUFF, W. T., Longbush, 1 R.D., Invercargill, 52, 17/2/61
ELLIS, McA. G., c/o Post Office, Warrington, 37, 26/1/61
ELLIS, Mr and Mrs R. H. and M. K., Dairy Flat, 2 R.D., Albany, 98, 21/2/61
ERICKSON, F. E. and J., Holmwood, Waipawa, 19, 30/1/61
FAIRWEATHER, H. J., 1 R.D., Hamilton, 97, 17/2/61
FINDLAY, D. and M. V., Rimu, 1 R.D., Invercargill, 34, 18/2/61
FLETCHER, M. W., West Belt, Rangiora, 36, 23/1/61
FOOTE, W. R., Purakanui, 1 R.D., Port Chalmers, 51, 10/2/61
FRIER, J. C., Waiau Pa, Patumahoe, R.D., 94, 7/2/61
GALLOP, F. H., P.O. Box 91, Hokitika, 57, 3/2/61
GARRETT, L. and R., 9 R.D., Invercargill, 28, 20/2/61
GEDDES, J. C., Green Island Bush, Green Island, 39, 2/2/61
GEORGE, P. V., 1 R.D., Outram, 53, 9/2/61
GEORGE, T., East Rd., Ohau, 46, 31/1/61
GERKEN, A. J., Charlton, Gore, 96, 26/1/61
GILLESPIE, L. G., Henley. 1 R.D., Outram, 101, 31/1/61
GIMBLETT, G., Gladstone Rd., Levin, 71, 20/2/61
GORRIE, L., Mangaroa, 97, 20/2/61
GRAHAM, J. L., Kennington, 7 R.D., Invercargill, 28, 18/2/61
GRAINGER, J. L., 1 R.D., Outram, 40, 9/2/61
GREEN, R. F., Pauatahanui, 45, 6/2/61
GREENSLADE BROS., Lincoln, 4 R.D., Christchurch, 94, 27/1/61
HADFIELD, G. R., Main Rd. North, Paraparaumu, 161, 7/2/61
HALL, C. A., 9 R.D., Invercargill, 72, 28/2/61
HALSTEAD, A. B., 147 Cavendish Rd., Christchurch, 21, 10/2/61
HAMILTON, W. A., 1 R.D., Outram, 15, 3/2/61
HAMMOND, F. A., Ladbrooks, 2 R.D., Christchurch, 44, 20/1/61
HANSEN, B. J., 1 R.D., Karaka, 41, 27/1/61
HARDY, G. A., Croydon Rd., Gore, 66, 2/2/61
HARGEST, S. J., Charlton, Gore, 79, 26/1/61
HARRIS, R., Rosedale Rd., 1 R.D., Albany, 33, 27/2/61
HAYCOCK, C. A. J., Station Rd., Ohakune, 62, 27/2/61
HEAPS, R. G., Dunns Rd., Mataura, 30, 7/2/61
HIGGINS, W., Beach Rd., Kaiapoi, Christchurch, 31, 20/2/61
HOLMES, R., 1 R.D., Outram, 5, 27/1/61
HUTCHINGS, G., and SONS (No. 1 Herd), Ngakuru, 1 R.D., Rotorua, 168, 20/2/61
HUTCHINGS, G., and SONS (No. 2 Herd), Ngakuru, 1 R.D., Rotorua, 154, 21/2/61
INNES, M. R., 9 R.D., Invercargill, 55, 21/2/61
JANSEN, F. E., Waitarere Beach Rd., Waitarere, 135, 6/2/61
JARDEN, R., 212 Port Hills Rd., Heathcote, Christchurch, 43, 30/1/61
JENKINS, A. N., Box 40, Otaki Railway, 143, 20/2/61
JENSEN, E. J., Box 25, Otaki Railway, 71, 31/1/61
JENSEN, T. E., Stewart Island, 3, 16/2/61
JOHNSTON, D. M. and N. J., 6 R.D., Palmerston North, 68, 14/2/61
KAWENGA TRUST, c/o Department of Maori Affairs, Gisborne, 135, 26/2/61
KEAST, J. L., Roslyn Bush, 2 R.D., Invercargill, 77, 20/2/61
KIMBER, H. D., 4 R.D., Hamilton, 80, 27/1/61
KING, W. B., Waerenga-a-hika, Gisborne, 60, 12/2/61
LAING, G. F., Laing's Rd., Karaka, 65, 16/1/61
LANGDALE-HUNT, E. A., Cass St., Kaiapoi, 47, 7/2/61
LARKIN, M. J., Rotomanu, Kumara, R.M.D., 48, 24/1/61
LEATHART, R. C., Coatesville, 3 R.D., Albany, 32, 14/2/61
LEEDER FARMS LTD., P.O. Box 10, Otaki, 49, 20/2/61
LINDSAY BROS., Mangaroa, 103, 21/2/61
LOCKYER, W., Waikanae Beach, Waikanae, 85, 21/2/61
LOGAN, J. W., Kamaka, Greymouth, 68, 3/2/61
LONG, B. C., P.O. Box 51, Te Horo, 80, 21/2/61
LONG, W. S., McArthur St., Levin, 149, 27/2/61
LOVE, H., 10 R.D., Waimate, 82, 14/2/61
LUMSDEN, H. A., Old Hautere Rd., R.D., Te Horo, 90, 30/1/61
McCAMMON, T. E., Maungatua, 1 R.D., Outram, 36, 9/2/61
McCORMICK, W., Milford, R.D., Temuka, 79, 20/2/61
MACDONALD, E. E., 311 Main Rd., Stokes Valley, 5, 24/2/61
MACDONALD, I. D. and C. D., Coal Creek, Greymouth, 56, 23/1/61
McDONNELL, F., 177 Tomahawk Rd., Dunedin, 13, 2/2/61
McGLASHAN, A. G., Kaniere, Greymouth, 76, 3/2/61
McINTOSH, G. P., Waikuku, Christchurch, 95, 30/1/61
McKEE, J. H., Manuka St., Castlecliff, 62, 31/1/61
McKELVIE, E. S., Tararua Rd., Levin, 67, 20/2/61
McMILLAN, J. G., Inchbonnie, Kumara, R.M.D., 149, 23/1/61
McMURDO, R. J., 37 Victoria St., Rangiora, 5, 20/2/61
McNEILL, R. C., Otokia, 1 R.D., Outram, 15, 31/1/61
MACPHERSON, C. H., Rimu, 41, 18/2/61
MARSHALL, J., Meeanee Rd., Meeanee, 85, 6/2/61
MARTYN, J., Est. of, Bruntwood, R.D., Cambridge, 108, 17/2/61
MARWICK, J. R., Clarkville, Kaiapoi, R.D., 56, 6/2/61
METHODIST CHILDREN'S HOME, 93 Harewood Rd., Papanui, Christchurch, 2, 6/2/61
MOONEY, D. W., Kaimatira Rd., Wanganui, 138, 28/2/61
MOORE, H. B., 190 Dyers Rd., Christchurch, 58, 12/1/61
MOORE, L. W., 117 Philpotts Rd., Christchurch, 51, 30/1/61
MOORE, T. A., 256 Grimseys Rd., Styx, 53, 3/2/61
MORRIS, E., 870 North Rd., Belfast, 20, 17/1/61
MORRIS, L. W., Otaihanga Rd., Paraparaumu, 66, 7/2/61
MORRISON, N. C., Matawhero, R.D., Gisborne, 47, 12/2/61
MOUGHAN, F. J., and Skidmore, J., Ashcott Rd., Waipukurau, 75, 30/1/61
MUIR OF ORD LTD., Makikihi, 74, 14/2/61
NEILL, J. and E., Maungatua, 1 R.D., Outram, 57, 3/2/61
NELSON, P., 9 R.D., Invercargill, 25, 20/2/61
NEWMAN, C. R., David St., Blenheim, 70, 13/2/61
NEWTON, E. A. A., Raupare, 5 R.D., Hastings, 57, 9/2/61
O'CONNELL, V. B., Waerenga-a-hika, Gisborne, 21, 15/2/61
O'NEIL, D., Ohoka Rd., Kaiapoi, 65, 18/1/61
OWEN, A. F., Makauri, R.D., Gisborne, 59, 26/2/61
PALMER, N. E., Ohape, R.D., Temuka, 86, 20/2/61
PARISH, J. R., 260 Cashmere Rd., Christchurch, 25, 12/1/61
PARSONS, A. W., Henley, 1 R.D., Outram, 21, 3/2/61
PERRY, J. B. and D. I., Te Ore Ore, Masterton, 59, 20/2/61
PETERSON, F. J., Seadown, 3 R.D., Timaru, 62, 20/2/61
PETHERAM, R. A., Springston, 4 R.D., Christchurch. 39, 20/1/61

TOWN SUPPLY HERDS . . .

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POLGLASE, R. W., R.D., Wakefield, Nelson, 61, 21/2/61
POPPE, H. R., Whales Line, Marton, 58, 1/2/61
POUTAMA, A., West Rd., Ohau, 51, 27/2/61
RAVENWOOD, A. V., Flaxton, Kaiapoi Rd., Christchurch, 35, 20/2/61
REID, D. M., Douglas Rd., Motueka, 36, 17/2/61
RICHARDS (INCHBONNIE) LTD., Inchbonnie, Kumara, R.M.D., 72, 24/1/61
RICHMOND, F. F., P.O. Box 12, Te Horo, 69, 21/2/61
ROBSON, R. F. and K. M., Brown's Rd., Drury, 168, 27/2/61
RUFFELL, R. L., Ohoka, Kaiapoi, R.D., 43, 6/2/61
RYAN, J. M., Rotomanu, Kumara, R.M.D., 57, 23/1/61
RYDER LTD., P. K., Inchbonnie, Kumara, R.M.D., 135, 24/1/61
SACRED HEART CONVENT, St. Johns Hill, Wanganui, 12, 31/1/61
SAINTY, A. G., Wainui, R.D., Kaukapakapa, 87, 27/2/61
SCHOLES, Mrs F. E., 44 Totara Cres., Lower Hutt, 103, 25/2/61
SEATON, A. G., Main Rd., Portobello, 50, 2/2/61
SHANKS, G., Charlton, Gore, 63, 27/1/61
SHENNAN ESTATE, c/o C. B. Reid, Berwick, 1 R.D., Outram, 68, 6/2/61
SMILEY, J., Basil Rd., Taradale, 42, 26/1/61
SMITH, L. L., Main Rd., Wakefield, 37, 14/2/61
SOPER, R. R., Woolwich St., Gore, 22, 2/2/61
STALKER, A., Est. of, P.O. Box 24, Rangiora, 130, 30/1/61
STEEDMAN, J. D., One Tree Point Rd., Whangarei, 39, 7/2/61
STEWART BROS., 119 Lower Styx Rd., Christchurch, 35, 10/2/61
STOCKER, J. H., Hadlow, 4 R.D., Timaru, 22, 7/2/61
STOKES and SONS, A. C., Kaiapoi Rd., Christchurch, 86, 21/2/61
STONE, O. T., Ladbrooks, 4 R.D., Christchurch, 17, 26/1/61
STUART, D. P., Pauatahanui, 23, 6/2/61
SULLIVAN, T. J., 258 Cashmere Rd., Christchurch, 47, 30/1/61
SUMMERS, A. E., Rerewhakaaitu, 3 R.D., Rotorua, 157, 28/2/61
TAIT, S. V., Te Karaka, Gisborne, 61, 19/2/61
TE KUMI FARMLANDS, Box 99, Te Kuiti, 119, 9/2/61
THOMSON, Miss M., Main North Rd., Kaiapoi, Christchurch, 7, 20/2/61
THOMSON, W. J., Maungatua, 1 R.D., Outram, 71, 7/2/61
TOWNSEND, S. J. L., 3 R.D., Pukekohe, 99, 3/1/61
TRENT FARM LTD., 5 R.D., Raupare, Hastings, 57, 3/2/61
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WAIKANAPA PARTNERSHIP, Muhunoa Rd. East, Ohau, 169, 8/2/61
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WEBB, C., Foxton Rd., R.D., Levin, 117, 6/2/61
WEHIPEIHANA, RAMEKA, Blue Lakes, Ohau, 45, 1/2/61
WELLS, S., R.D., Wakefield, Nelson, 35, 21/2/61
WHAKAREWA BOYS' HOME, Baton, R.D., Motueka, 21, 21/2/61
WHALE, S. D., Ruapehu Rd., Ohakune, 84, 14/2/61
WINDELEV, G. D., P.O. Box 11, Te Horo, 66, 27/2/61
WOODS, E. G., Lansdowne Rd., Halswell, 45, 12/1/61
WORNALL and KELLY, Rotomanu, Kumara, R.M.D., 144, 23/1/61
WRIGHT, F. R., R.D., Wainui, Kaukapakapa, 73, 21/2/61

Certificate Suspended

The following certificate is suspended:

YULE, D. A., Ormond Rd., 5 R.D., Hastings, 70, 13/1/61

Radio Broadcasts for Farmers

RADIO broadcasts for farmers will be given during June as follows:

1XH Hamilton, 12.33 p.m.

12 June—"Y.F.C. News", by Waipa Y.F.C. district committee.

19 June—"Dairy Matters", by J. O. Toner, Federated Farmers.

26 June—"Good Rearing of Dairy Calves", by G. W. Carter, Livestock Instructor, Department of Agriculture, Hamilton.

1YZ Rotorua, 7.15 p.m.

7 June—"Granulation and Fermentation in Honey", by D. A. Briscoe, Apiary Instructor, Department of Agriculture, Tauranga.

21 June—"Herd Management at Calving Time", by K. G. B. Wilson, Livestock Instructor, Department of Agriculture, Matamata.

2XG Gisborne, 8 p.m.

6 June—"Report on Current Local Research of Farm Advisory Division, Department of Agriculture", by H. de O. Chamberlain, Farm Advisory Officer, Department of Agriculture, Gisborne.

13 June—"For the Orchardist", by J. D. Overbye, Horticultural Instructor, Department of Agriculture, Gisborne.

27 June—"Spring Fever on the Dairy Farm", by H. P. Skyrme, Veterinarian, Department of Agriculture, Gisborne.

2XA Wanganui, 8 p.m.

1 June—"For the Country Women", by Mary Macdonald.

8 June—"Farming News".

15 June—"Sheep and Wool Field Notes", by P. C. Marshall, Sheep and Wool Instructor, Department of Agriculture, Wanganui.

22 June—"Latest Developments in Farm Crops", by A. K. Booth, Farm Advisory Officer, Department of Agriculture, Wanganui.

29 June—"Fertilisers for Market Gardens", by G. N. Paulin, Horticultural Instructor, Department of Agriculture, Wanganui.

2YZ Napier, 7.10 p.m.

6 June—"Common Stock Diseases", by C. T. Craik, Livestock Instructor, Department of Agriculture, Hastings.

20 June—"Farm Drainage", by E. W. S. Wilson, Fields Instructor, Department of Agriculture, Hastings.

2XB Masterton, 6.45 p.m.

9 June—"Y.F.C. Session".

2XP New Plymouth, 8 p.m.

1 June—"News and Views from the Farm Advisory Division", by B. R. Hedley, Fields Instructor, Department of Agriculture, New Plymouth. David Smith's Y.F.C. session.

15 June—"Preparing for the Chick Season", by B. J. Russell, Poultry Instructor, Department of Agriculture, Wanganui.

22 June—"Radio Vet.", by J. H. Macdonald, Veterinarian, Department of Agriculture, New Plymouth.

4YA Dunedin and 4YZ Invercargill, 12.36 p.m.

12 June—"'Management of Ewes before Lambing", by D. H. Le Souef, Livestock Superintendent, Department of Agriculture, Dunedin.

Regular Sessions

1YA Auckland, Mondays at 12.36 p.m. ("Country Journal", including "Report from Ruakura"), Tuesdays, Wednesdays, Thursdays, and Fridays at 12.33 p.m. ("Country Journal"), Thursdays at 12.33 p.m. ("'News for the Farmer").

1XN Whangarei, Mondays at 8 p.m. ("Northland Stock Market Report", followed by "Farming for Profit"), Wednesdays at 8 p.m. ("Farming for Profit"), and Fridays at 12.33 p.m. ("Farm News").

1XH Hamilton, Mondays at 12.36 p.m. ("For the Farmer", excluding first Monday in month and public holidays), Wednesdays at 12.33 p.m. ("Report from Ruakura").

1YZ Rotorua, Wednesdays at 7 p.m. ("Bay of Plenty Journal"), Thursdays, 12.33 p.m. ("News for the Farmer").

2YZ Napier, Tuesdays at 7.10 p.m. ("The Hawke's Bay Farmer") and Thursdays at 12.33 p.m. ("News for the Farmer").

2XG Gisborne, Tuesdays at 8 p.m. ("Farm Session").

2XP New Plymouth, Thursdays at 8 p.m. ("Farm Session").

2XA Wanganui, Mondays at 8 p.m. ("For the Man on the Land"), Tuesdays at 8 p.m. ("Farm Supplement"), and Thursdays at 8 p.m. ("Farm Topics").

2XB Masterton, Fridays at 6.45 p.m. ("Farm Session").

2XN Nelson, Thursdays at 8 p.m. ("Nelson Farm Topics").

2ZA Palmerston North, Mondays at 12.36 p.m. ("Country Digest"), and Fridays at 8.30 p.m. ("Country Digest", including Feilding stock market report).

2YA Wellington, Mondays, Tuesdays, and Fridays at 7.10 p.m. ("Farm Session"), Thursdays at 12.33 p.m. ("News for the Farmer").

3YA Christchurch, Mondays at 12.20 p.m. ("Country Session"), Thursdays at 12.33 p.m. ("News for the Farmer"), and 7.10 p.m. ("Home Paddock").

3XC Timaru, Wednesdays at 8 p.m. ("Farmers' Weekly News Service"), and Saturdays at 10.30 a.m. ("Country Mailbag").

3YZ Greymouth, Mondays at 12.36 p.m. Thursdays at 12.33 p.m. ("News for the Farmer").

4YA Dunedin, Mondays at 12.36 p.m., Tuesdays, Wednesdays, and Thursdays at 12.33 p.m.

4YZ Invercargill, Mondays at 12.36 p.m., Wednesdays and Thursdays at 12.33 p.m. ("News for the Farmer").

◆

Winter Show Dates

*30, 31 May, 1, 2, 3, 5, and 6 June—Waikato at Hamilton.
*1, 2, 3, 5, and 6 June—Otago at Dunedin.
8, 9, and 10 June—Te Kuiti and District at Te Kuiti.
*14, 15, 16, and 17 June—Taranaki at New Plymouth.
20, 21, 22, 23, 24 June—Whangarei at Whangarei.

* The Department of Agriculture exhibit will be staged at this show.

Breeding Stock Sale

27 July—National Stud Hereford Show and sale at Palmerston North.

◆

Wool Sales

The dates and venues of wool sales up to the end of June are:

20 May: Wanganui.
24 and 26 May: Napier.
31 May and 2 June: Auckland.
7 June: Wellington.

◆

Vegetable Growing for
HOME and MARKET GARDENERS

Organic Material and Compost

By HORTICULTURE DIVISION

MOST commercial and home gardeners are well aware that humus is lost from soil which is under constant cultivation and of the need for replacing it to maintain good soil conditions. Without a good supply of organic matter in the soil to be converted into humus it is difficult to keep a good tilth, adequate moisture and aeration are hard to maintain, and cropping becomes difficult. This article discusses ways in which commercial and home gardeners may replace organic material lost through intense cultivation.

THE grass family is a most useful one for improving soil structure, as the fibrous roots quickly improve soils which have become heavy through compaction.

On commercial vegetable properties grass is best used where there is sufficient room to grass down an area for two or more years. Usually this is done in conjunction with sheep grazing.

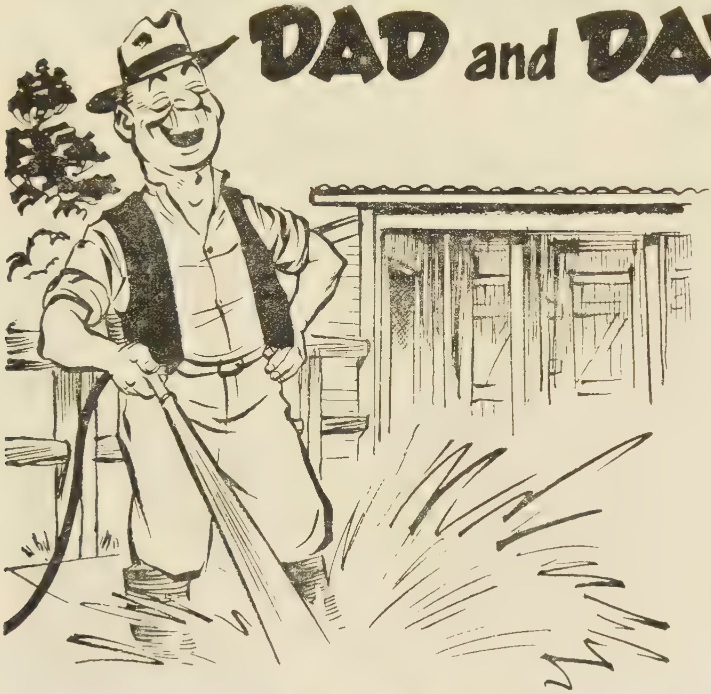
Market garden soils, because of heavy fertiliser applications used on them are usually highly fertile and no further fertiliser is normally required for grass establishment. Once established in grass these areas can usually support a fairly high stocking rate until they are again required for cropping. Meantime stock droppings and urine contribute substantially to the organic content of the soil.

Growers contemplating using this method of building up humus should consult their local Horticultural Advisory Officer about grass mixtures and sowing times.

Cover Crops

Another popular method of restoring the reserve of organic material in soils is through the use of cover crops, of which there are two main groups: Legumes, which supply nitrogen to the

DAD and DAVIES ON THE FARM



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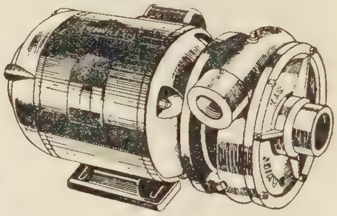

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soil as well as organic material, and cereals, valuable for their ability to improve soil structure through the action of their roots.

Legumes

Legumes vary in the production of bulk of green material, but all have the ability to fix free nitrogen from the air due to the activity of bacteria associated with their root system.

Many types of legumes such as vetches and clovers, may be grown as cover crops, but blue lupins are most commonly sown. They grow quickly and soon produce a large bulk of green material.

Seed is usually sown from early January to mid March and the plants turned into the soil just before flower heads reach full bloom. It is only necessary to work this crop roughly into the soil, for it breaks down fairly quickly.

Cereals such as oats, barley, and ryecorn are very suitable for cover crops. Sown in late January or early February, they are disced into the soil (dug in in home gardens) in August.

Barley and oats should be sown at 2½ to 3 bushels per acre and ryecorn at 2 bushels per acre.

It is not wise to grow either lupins or a cereal continually as the cover crop because of the risk of building up diseases through use of the one species. Use them in rotation.

Materials for Adding to Soil

Many materials suitable for turning in to the soil to build up its organic matter are available to both market and home gardeners.

Hay

In districts where grass and clover seed is grown considerable quantities of hay are available after the seed has been threshed. This material is usually available for the cost of baling plus cartage. For commercial gardens it is necessary to place the hay in heaps to partly rot down before being spread and disced or rotary hoed into the soil, as there is insufficient time between crops for fresh straw to rot. Usually a bale to each 100 sq. ft. or about 450 bales per acre are worked in.

Wheat straw can be similarly used, and when either wheat straw or hay is applied a dressing of blood and bone (2 to 3 cwt per acre) should be broadcast over it to overcome any loss of nitrogen from the soil which occurs as the organic material is being broken down.

[*Sparrow*

Abundant organic material in soil encourages increase in the number of beneficial worms.

A crop of oats at the correct stage for turning in.

Pea Haulms

Large quantities of pea haulms are available where peas are grown extensively for processing. Pea crops which have passed through viners are especially valuable as organic matter, as the residue contains all the plant except the peas.

However, continued working in of pea haulms on ground used for growing peas is unwise, as it can cause build up of some pea diseases. When it is used as a mulch its rapid decomposition can cause a most unpleasant odour, but this can be overcome largely by mixing pea haulms with other, coarser material such as hay or wheat straw.

Sawdust

Sawdust is plentiful and is easy to handle, but has the drawback of temporarily producing severe nitrogen deficiency. Fairly substantial amounts of nitrogenous fertiliser must be added to correct this.

Weathering of sawdust before application offsets some nitrogen loss and many commercial growers and home gardeners do this by keeping a stockpile of sawdust open to sun and rain. It is used after this weathering has reduced its rawness.

A sample of well weathered *Pinus radiata* sawdust tested by the Department of Agriculture showed a need of 12½ lb of sulphate of ammonia to each 100 lb (dry weight) of sawdust. This can still be economical for small areas where sawdust is needed to improve the structure of compacted soil. Where

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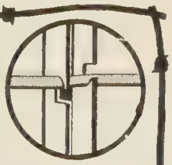

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[*Green and Hahn*

Many gardeners keep a stockpile of sawdust so that it can weather before application to the soil. Though this weathered mulch does not deplete nitrogen in the soil to the extent that new sawdust does, nitrogenous manure should always be added when sawdust is applied.

possible coarse-grained sawdust should be used, as this gives a better and longer-lasting mechanical effect in restoring structure to compacted soils.

Sawdust is usually applied to 4 to 6 lb per square yard (about 8 to 12 tons per acre). Thus when used commercially sawdust spread at 12 tons per acre requires the addition of about 1 ton 4 cwt of sulphate of ammonia to overcome any temporary nitrogen shortage.

Compost

The importance in home gardens of returning all organic wastes from the kitchen and garden to the soil can hardly be over-emphasised. The properly constructed compost heap offers a cheap, odourless, and hygienic method by which waste material can be converted to humus. However, some gardeners feel that in view of the work involved in building a compost heap, the attention that is required, such as tidying, watering, and turning, and the delay that must occur before the material can be dug in, it is preferable to dig garden trash directly into the soil.

Some points in favour of a properly made compost heap are that it is clean and hygienic and will not attract flies or have any offensive odour; it should produce a complete plant food in a very desirable form from very diverse materials in a short time; and, if the heap has been properly made, turned, and allowed to mature, the resulting compost not only will be a safe food for any plant, whether long established or just a seedling, but will improve any soil whatever its texture.

Compost is basically humus and though home gardeners sometimes differ in what they call humus, in ordinary usage the word applies to the dark earthy mould produced at a late stage in the breaking down of organic matter—the dark granular or powdery substance which is an intimate component of all soils in which plants grow well. The organic matter from which it is formed includes the residues of plants, animals, birds, insects, fish, and fungi; in fact all material which was once part of some living thing.

The quality of any particular sample of humus is determined by factors such as its stage of decay and the kind of organic matter from which it was formed—for instance, whether or not it was rich in minerals—and to some extent by the sort of breaking down that took place. The factors mentioned are in turn influenced by the nitrogen-carbon ratio and by temperature, moisture, and aeration; whether breaking down was brought about largely by micro-organisms that require the free air (oxygen) of the atmosphere or by those that derive their oxygen largely from other sources, such as from the breakdown of other material; or whether sulphate of ammonia or similar activating substances and other fertilisers, such as sulphate of potash and superphosphate, were used.

Valuable Properties of Humus

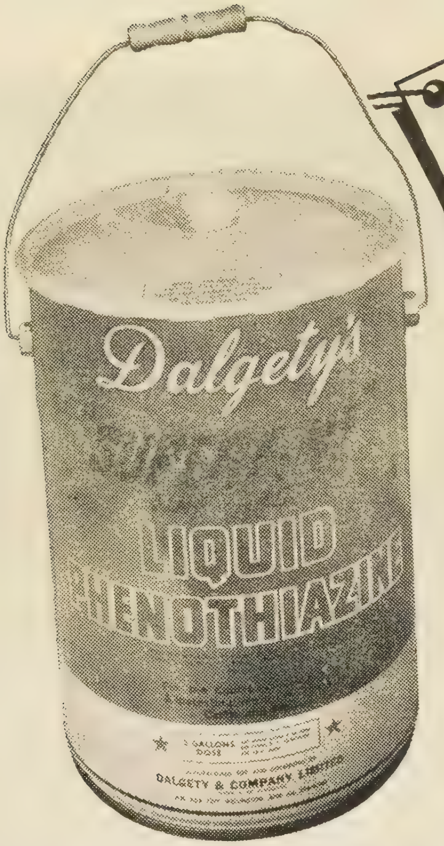
Humus is not only a source of plant food, but greatly influences the formation of the desirable crumby texture or structure of a soil (the state which leads to formation of good tilth). Humus improves the cohesion of light soils and increases their capacity for retaining plant foods and moisture; it improves heavy soils and darkens light-coloured soils, causing them to warm more readily; and, largely because vegetation grows so readily in it, it tends to prevent the wind blowing away topsoil. The fineness of the particles and their cohesion give humus a sponge-like capacity for absorbing and retaining moisture and facilitates the drainage of excess moisture. It is thus of considerable value in preventing soil erosion under heavy rain.

Humus reduces the stickiness of clay and thus improves aeration and drainage. There is also evidence that compost influences the nutrition of plants to a greater extent than is explained by the plant foods in it (possibly because of the life it contains and the fact that the organic matter of which it is composed in decomposing gives off carbon dioxide, a mild acid which makes minerals more available to plants).

Applying Compost

As in most home gardens not a great deal of compost is available, it can be used best in the top 4 in. of soil. If it is properly rotted, it can be placed in the seed drill. Most kinds of seeds can be sown in it, though with pea seed it is better placed 2 to 3 in. below the drill. It is also useful in "pockets" in which plants such as tomatoes or cauliflowers are set out.

Compost can be stored quite well until required if it is kept moist and cool and aeration is reduced. Under these conditions oxidation or "burning" of the humus, which occurs con-



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[*Photo News*

A simple compost heap in which all waste organic material is used and a little sulphate of ammonia is sprinkled over each layer. Often compost heaps of this type contain thick wood y material, such as prunings, which will not decay by the time the heap is mature. Such material should be separated from the compost with a coarse sieve before it is applied.

tinuously in the presence of air, is greatly retarded.

Suitable Compost Materials and What to Exclude

Organic material (material formed from something that was living) of all kinds may be used for compost if suitably layered. It is best to let sawdust and shavings in quantity rot in a special heap, but the contents of vacuum cleaners, tea leaves, coffee grounds, scraps of waste food, seaweed, bones, and feathers can all be used.

The following should **not** be used, but can be burnt and the ashes added to the heap:

Thick woody stems such as those of brussels sprouts and cabbage (unless bruised and chopped).

Perennial weeds such as docks, convolvulus, and couch grass (unless the heap is very well made).

A large amount of printed paper or materials tainted with disinfectants, oil, creosote, paint, or preservative.

Most plants or plant parts infested with harmful insects or bearing the spores of long-lived diseases.

Location of Heap

The compost heap should not be exposed to hot sun or drying winds nor should it be on an entirely sunless and overgrown situation subject to excessive dripping or cold. Fungi, bacteria, and earthworms play a part in the breakdown of materials in the compost heap, but for them to function efficiently reasonable warmth, aeration, and continued moist conditions are essential.

The heap should be reasonably handy for the housewife and easily accessible with a wheelbarrow. Proximity to water, too, is a consideration for large heaps situated where they dry out quickly. To reduce carrying distances in large gardens it may be advisable to have two or more heaps.

Building the Heap

For the home gardener the size of a heap will be determined mainly by the amount of material available, but whatever the shape—conical, pyramidal, square, or oblong—and whether high or low the important points to consider are aeration, retention of moisture, drainage, and a good ground contact of bare forked earth to facilitate entry of earthworms and soil organisms.

Because a good supply of air is very important, aeration from the base should be provided by a field or drain pipe or a quantity of open material such as woody hedge clippings. Properly constructed bins usually have a grid at the bottom to which air is supplied by a pipe.

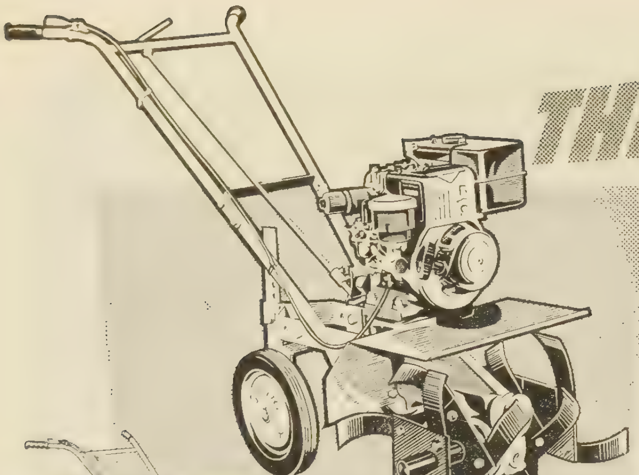
Though methods of composting vegetable wastes may vary widely in detail, the principles are similar in all cases. Layers of the materials to be composted are alternated with thin layers of farmyard manure or a good sprinkling of manure or nitrogenous fertiliser. Lime is usually added to reduce acidity and so enable bacterial activity to increase.

Heaps are usually relatively long and about 3 ft 6 in. to 4 ft wide and rarely higher than 4 ft. In heaps smaller than about 4 ft wide by about 4 ft long the ratio of exposed surface is disproportionately large in comparison to the volume and the breaking down of the material is slower. A bin is specially desirable, therefore, for small heaps.

The rate of decay depends largely on the nitrogen and air present. Wood is best for retaining walls, but wire netting will do. Stone, concrete, or iron is usually considered less satisfactory owing to heat loss and difficulty of providing aeration; brick is more porous and, if ventilation is provided, will prove satisfactory. No floor other than ordinary earth is needed, though an air supply from the bottom is essential.

A special wooden container or preferably a series of them, built so that the compost can be turned successively as breaking down proceeds, is probably ideal for the home gardener. A box about 12 ft long, 4 ft wide, and 4 ft high, divided into three compartments by movable partitions and a movable end to facilitate turning and removal of the compost, is easy to make. Movable ends or partitions can be of boards in slots. Bottom ventilation can be provided by wire netting or iron grids, with pipes to the outside if necessary.

Compost can be produced by using as an activator either organic material



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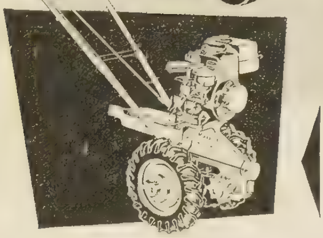

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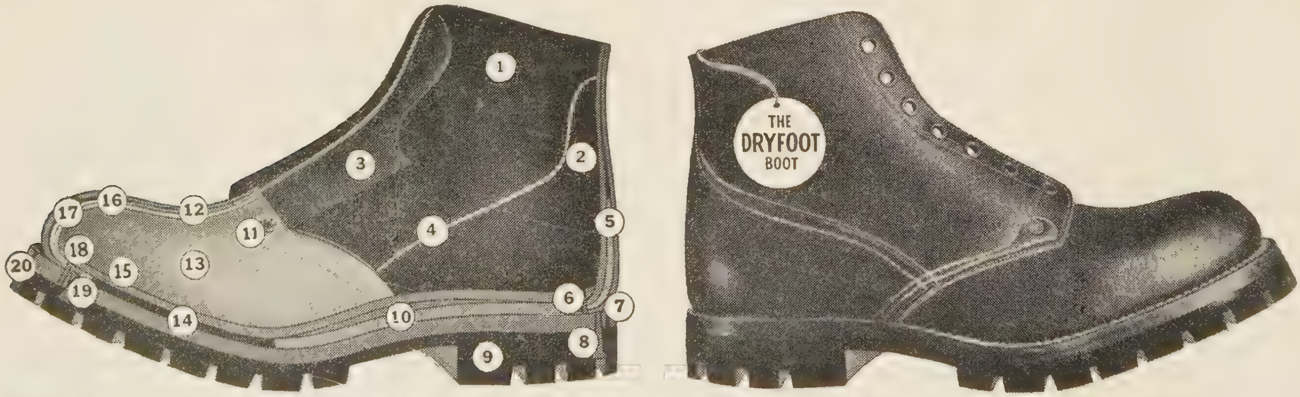

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(such as fowl or farmyard manure or dried blood) or a mineral fertiliser such as sulphate of ammonia either alone or in combination with other organic or mineral fertilisers. Ground limestone should also be used to reduce acidity, as excess acidity slows bacterial action and so delays rotting.

Layers of the material to be rotted can be about 4 to 8 in. thick. Green, sappy material should be laid loosely; drier and more strawy material should be moistened and firmed. The finer it is chopped and mixed the better.

Adequate nitrogenous material is essential for speedy rotting. Layers of organic manure such as farmyard or poultry manure should be 1 to 2 in. thick according to the amount of litter the material contains. The less concentrated it is, that is, the more litter it contains, the thicker it should be. If dried blood is used, it should merely be sprinkled on fairly heavily. The manure can be topped off with a layer of soil and the next layer of trash then applied. Lime can be sprinkled either on the layer of soil or in the middle of the layer of garden trash.

When organic material for use as an activator is not available a more balanced plant food than that obtained by the use of sulphate of ammonia alone can be obtained by using a mixture of 4 parts of sulphate of ammonia, 3 parts of superphosphate, 1 part of muriate or sulphate of potash, and 2 or 3 parts of ground limestone, all by weight, at about 6 lb to 1 cwt of average, mixed, partly wilted garden trash. The more strawy the material is the greater will be the amount of sulphate of ammonia required. (If the amount of sulphate of ammonia is increased, more lime also may have to be added.)

When used alone as an activator sulphate of ammonia should be added at about 2 lb to 1 cwt of mixed, partly wilted garden trash. About 1 to 2 lb of carbonate of lime should also be used.

Rotting is usually speeded by making vertical air vents 3 to 4 in. in diameter at the top of the heap with a crowbar or rake handle at intervals about 12 to 18 in. from the sides of the heap. Though much depends on the material and the way it is stacked, the temperature should rise within a week or two of the completion of the heap. When the heat begins to decline, in from three to 12 weeks, according to temperatures (rotting is quicker in summer than in winter), the heap should be turned (the heap should by then have sunk by about a third), the layers being mixed and the unrotted outside material being turned to the middle.

The heap should be kept moist but not wet and it should be tested periodically for moisture content by inserting a stick, withdrawing it, and examining the adhering material for moisture. A roof or covering is often desirable so that the heap is neither soaked by rain nor dried excessively by the sun.

An unsheltered heap can be ridged to help shed rain. Exposed portions of the heap can be covered with a layer of soil 2 to 5 in. thick (the lighter the soil the thicker the layer) to retain heat and moisture and so that the heap will not attract flies. Regular spraying with DDT will give additional protection.

☆

June Work in the Home Garden

By A. G. KENNELLY,

Horticultural Instructor, Department of Agriculture, Dunedin

THERE is rarely much to be gained in the less favourably situated gardens by sowing even the hardiest vegetables in June, but elsewhere if drainage and soil conditions are good, broad beans, spinach, and even peas can be sown. The sowing of other hardy vegetables is best deferred until at least July; in some districts delaying sowing until August and even September may be advisable.

THE well organised garden is a planned garden. Thought has been given to the timing of sowings and plantings, to the siting of plants, and to the sort of succession that is likely to give greatest freedom from disease and the greatest yield of quality produce available when it is wanted. June is a good time for garden planning because the weather restricts garden work and for most home gardeners it more or less marks the end of one growing season and the beginning of another. It is a good time to go over seed catalogues and make up plant or seed orders.

June is a suitable time to undertake reconstruction work in the garden, to lay drains or paths, or to make new garden features; to sharpen or repair tools and machinery; to work on trellises, fences, railings, pergolas, garden seats and rock features; to repair cloches, frames, and glasshouses; and to clean up garden rubbish and prepare stakes and posts to be used in the forthcoming season.

SOWING AND PLANTING

Sow as Required

Broad beans	In well drained soil in favourable situations
Spinach	
Cabbage	
Cauliflower	
Kohl rabi	
Lettuce (for late spring use)	
Peas	

Plant

Cabbage	In well drained soil
Cauliflower	
Lettuce	
Shallots	
Rhubarb	
Asparagus	
Horse radish	
Potatoes (in early districts)	

Preserving Timber

Most kinds of timber kept in contact with the ground rot fairly quickly unless it is dressed with a good preservative. Several preservatives, mostly sold under proprietary names, are available. Creosote, pentachlorophenol, and insoluble copper compounds are effective where penetration is adequate.

Treating timber with preservative is usually well worth while, even if it gives only another year of use; if timber is properly treated with a good preservative that does not leach out, it should last for many years longer than similar untreated softwood.

Garden tools should be kept sharp, clean, and rust free. Soil and rust sticking to garden tools makes work much more difficult. Cutting edges and points should be sharp unless the tools are to be used by children or those who cannot handle them competently, when they are better not filed to the extent that they may be dangerous.

Attention to Winter Crops

Celery and leeks should receive their final earthing up if this work has not yet been done, and the digging of potatoes should be completed without delay. Broccoli or winter cauliflowers should be watched for signs of approaching maturity and the developing curds protected by bending or breaking a leaf or two over each.

Spring cabbage can still be set out in most gardens; cauliflower also may be planted in sheltered situations or in districts where winters are not too severe. Soils should be well drained and adequately enriched, preferably with organic material such as compost and farmyard or stable manure.

Land from which crops have been recently harvested and which is to be used within the next month or so should be dug over to improve drainage and to assist the rotting of root fibres and similar residues and to

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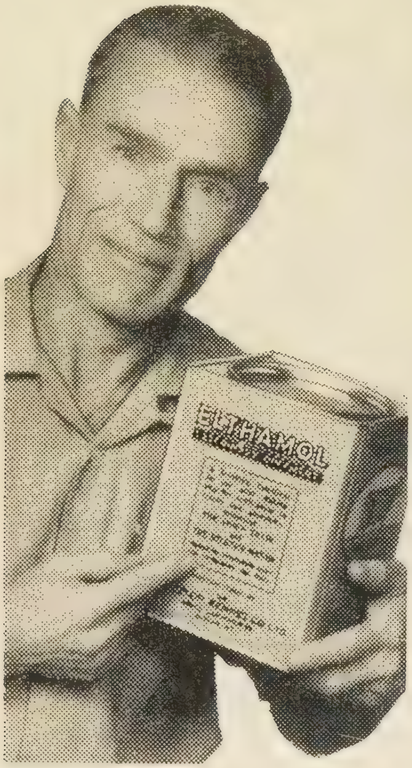

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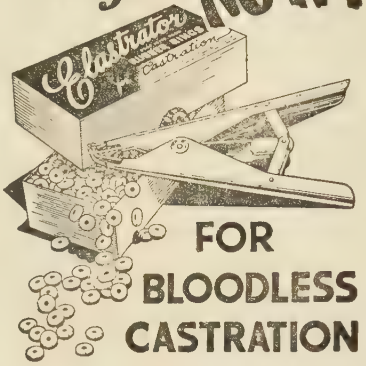

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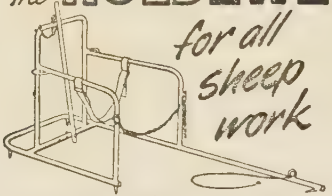

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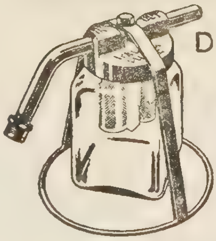

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expose insect pests and their eggs to birds and other controlling agencies.

Green crops that are in the flowering stage or approaching it and which are growing on land soon to be used for a vegetable crop should be turned in to rot down. If digging is left too long, the weather may make it more difficult.

Asparagus fern growth should be cut down if this has not been done, and the bed mulched with compost or a light dressing of farmyard manure. The compost heap can be turned or remade.

Broad beans can be sown to provide succession or a first sowing can be made in June if soil conditions are favourable. Broad beans are very hardy. They respond to fertile soils, but on a soil that was well enriched for a previous crop 2 or 3 oz of superphosphate is often the only fertiliser needed.

Lime

Lime can be applied at any time of the year, but it can usually be conveniently applied in late autumn, winter, or early spring, when there is a considerable amount of vacant land and when rains will wash it in. Though the calcium lime contains is an essential plant nutrient, lime is not regarded as a fertiliser. When applied judiciously it has a threefold fertilising effect: biological, chemical, and physical.

Biological: In soils that contain adequate lime beneficial organisms, for example, certain bacteria and fungi, and soil animals such as worms, all of which play a part in breaking down plant and animal refuse and converting it into forms which can be assimilated by plants, are able to flourish to a much greater extent than where the soil is excessively acid.

The disease club root, which is often troublesome in cruciferous crops (cabbage, turnip, etc.), occurs more frequently on lime-deficient soil, though, conversely, potato scab disease occurs principally in soils well supplied with lime.

Chemical: The form and availability of applied fertilisers and of plant nutrients in the soil generally are greatly influenced by the degree of acidity or amount of lime applied to a soil. The extent to which fertilisers may be made more readily available in a soil by correction of its acidity varies, however, according to moisture, organic matter, minerals, or other soil characteristics.

Physical: The physical effect of lime on some soils is very important. It is a basic factor in tilth formation and helps to ensure satisfactory water movement through the soil. It renders heavy soils less sticky by flocculating (causing to adhere in flakes or granules) the fine matter of the clay it contains. However, it does not flocculate silt and thus a silt soil is not necessarily rendered less sticky by liming. This improvement in the soil structure aids aeration and drainage and thus makes the soil open and friable and easier to work and more favourable for plant growth.

[*Green and Hahn*

June is a good time to apply lime.

Types of Lime

Lime may be white, dirty white, yellowish, or brown; colour is no measure of its purity. The most important factor in any lime is its calcium content, though the immediate effectiveness of lime also depends partly on fineness of grinding (the finer the particles are the more quickly will it be available and the more intimate can its contact be with the soil particles). Hardness of limestone also has a bearing on the availability of ground limestone.

Lime should always be applied as evenly as possible, as there is little sideways spread except by mechanical means. However, unless lime is urgently needed, as when club root occurs, it is not usually necessary to work it in deeply. Downward spread is assured by rain.

The different types of lime commonly used by the home gardener are calcium carbonate (limestone), calcium hydroxide (hydrated lime), and calcium oxide (burnt lime). On a comparative basis, if the different forms are prepared from pure limestone rock, 56 lb of burnt lime has the same value as 75 lb to 85 lb of hydrated lime or 100 lb of calcium carbonate (ground limestone). When lime is applied, therefore, proportionately heavier dressings of carbonate of lime or hydrated lime will be required to achieve the same effect as when burnt lime is used.

In common usage the word "lime" is the equivalent of or a substitute for calcium, as in general it is used to cover a considerable range of materials used for the calcium they contain and may mean pulverised marble, shells, chalk, or rock lime in lumps.

Carbonate of lime (the natural form of limestone, chalk, or ground shells) or calcium carbonate or unburnt or "mild" lime consists of calcium oxide combined with carbonic acid and mineral impurities. Its advantage over hydrated lime is that it is less soluble and therefore does not wash out of the soil as readily as the former. In the soil it has almost all the virtues of hydrated lime and in addition has no adverse effect on germination. Unlike burnt lime it does not decrease the small content of humus in light soils.

Hydrated lime (calcium hydroxide, slaked lime, hydroxide of lime) is obtained by treating burnt lime or quicklime with water, which it absorbs readily, heating in the process and, unless too much water is applied, finally breaking down into a fine powder. The treating of burnt lime with water is known as slaking, and slaked lime may be properly regarded as burnt lime (calcium oxide) diluted with about one-third of its weight of water. It stores well, is easy to handle, and is fairly readily soluble. As in general it is harmless to growing plants, it may be applied at any time of the year. Where seed is sown, however, it should be applied at least 10 to 14 days before sowing, as otherwise it may affect germination. It is useful for making up whitewash and Bordeaux mixture.

Burnt lime (calcium oxide or oxide of lime) is sometimes known as caustic, unslaked, or builder's lime or quicklime. It consists chiefly of lime in the form of calcium oxide. It is produced by heating lumps of quarried limestone in a specially designed kiln. Fresh burnt lime should not be allowed to come in contact with vegetation. Left in the soil for some days or weeks it becomes slaked, loses its caustic properties, and reverts to calcium carbonate, the state in which it existed before it was burnt in the kiln. Unless required for a special purpose burnt lime is not recommended for the home garden. Small quantities are best stored in sealed tins.

Loss of Lime in the Soil

Lime is continuously lost from the soil, a very small amount through being absorbed in solution by plants, as calcium enters into the composition of all plants (and of animals, especially in the formation of bones and teeth). Lime is lost mainly through its being washed out of the soil by rainwater, which like soil water is charged with carbon dioxide and thus has a considerable effect in dissolving lime in the soil.

The loss occurs in all districts where rainfall is greater than evaporation, and is greatest on cultivated land and under conditions of free drainage and high rainfall, though the rate of loss also depends on the amount of calcium carbonate and free lime present. Other things being equal, the loss will be least in soils in low-rainfall districts.

Vegetables and Lime

Most vegetable crops prefer a neutral to slightly acid soil, though they will succeed in slightly alkaline conditions. Their response to soil acidity or alkalinity is also influenced by moisture, soil texture, organic matter present, and other factors.

Some crops, for example, potatoes and water melons, can tolerate considerable acidity. Except for blue lupins, which are often grown in the home garden as a green crop, legumes generally prefer a soil that has been limed or has a neutral reaction. Barley, which is also often used in the home garden as a green crop, is likely to fail on acid soils, and as it is quick growing, it is occasionally used as an indicator plant.

Most New Zealand soils tend to be deficient in lime, but it is not possible to make an accurate over-all recommendation for the application of lime to all home garden soils. Soil type and management, crops grown, and rainfall must all be considered, and these factors vary greatly throughout the country.

Usually the application of comparatively small dressings (say, 2 to 4 oz a square yard) at frequent intervals is likely to be more satisfactory, particularly on the lighter types of soil, than heavy dressings at intervals of, say, three or four years. However, on some soils that are heavily buffered (resistant to change in acidity), heavy initial dressings (up to 2 lb a square yard) may be advisable. That is a great deal of lime and is equivalent to more than 4 tons an acre.

◆

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The main aim of the Freedom-from-Hunger Campaign is to raise agricultural productivity and through this the standard of life of less-favoured peoples. Where possible primitive methods are being replaced by modern techniques of farming or manufacture.

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Young Nepalese men are being trained in the processing of milk and milk products and the foundation is being laid for a sound dairy industry in this remote country. Effort has been mainly concentrated on the setting up of a small dairy centre to receive the milk brought in from isolated mountain farms and from the nomadic herds in the high Himalayas.

The equipment to begin this work was supplied by the Food and Agriculture Organization. Both the quality and quantity of the milk products in Nepal, such as butter and ghee (butterfat for cooking), have been improved as a result.

The Home Orchard in Winter

By S. FREW,
Instructor in Horticulture,
Department of Agriculture,
Christchurch

[*Rendell*

In the restoration of a neglected orchard eradication of rejected trees should be complete. Stumps such as these are a potential source of disease.

WITH the present general trend of subdivision of large town sections, and sometimes through the sale of town and country properties, many new owners face the problem of old or neglected orchards. Whether such orchards should be renovated or removed, and, if they are fit for renovation, the methods which should be employed are discussed in this article, which also describes routine winter work in the well cared for home orchard.

THE NEGLECTED ORCHARD

Trees to Discard and Trees to Keep

HOME orchards may have young trees which have been uncared for or old neglected trees.

Young trees are usually capable of renovation provided they have been planted on suitable soil. It is seldom worth while persevering with trees growing in unfavourable positions. Very few kinds of fruit trees will thrive on poorly drained soil. European plums, pears, and quinces are fairly tolerant of wet soils, but all other kinds of fruit trees need reasonably good drainage and will never be satisfactory unless this is provided. If the drainage of a wet soil cannot be improved, any apple, cherry, peach, nectarine, or Japanese plum trees might just as well be removed and either replaced with the more tolerant kinds or the land used for other purposes.

If soil conditions are satisfactory, young neglected trees should be hard pruned to a sturdy framework, the land cultivated, and a dressing of 1 to 2 lb of a fertiliser such as blood and bone worked in around each tree. This should result in the trees making a satisfactory recovery.

Old neglected trees are a more complex problem. The general appearance of such trees, or their apparent lack of vigour, is not necessarily a true guide to their further usefulness. The age and relative size of trees, whether they have good or poor root anchorage, and the prevalence or absence of serious disease are the main factors which must be considered.

Age of Trees

Some apple and pear trees in New Zealand are now nearly 100 years old and are still producing good crops. Also some cherry, apricot, and European plum trees well over 50 years old are still thriving. Japanese plums, peaches, and nectarines have a relatively short economic life. Renovation of large, old peach, nectarine, and Japanese plum trees is seldom worth while. Furthermore, the renovation usually means some heavy cutting, and the susceptibility of these trees to the disease silver leaf after heavy pruning is a further reason for not trying to rejuvenate them. Most other kinds of fruit trees, however, may be worth renovating in spite of their age.

Size of Trees

A large fruit tree is, or has been, a vigorous one, and should have a good rooting system. It should be favourably considered for renovation. An old small tree may still be highly productive and should not be condemned for its size alone. It may be worth retaining if it is healthy and has a sound rooting system. A small, stunted tree with no growth, red bark, and small leaves has all the symptoms of unthriftiness and is seldom worth trying to resuscitate.

Root Anchorage

Trees without a good root system will never flourish. Root anchorage may be tested by trying to rock the tree. If any appreciable movement at the base results, there is obviously a weakness in the roots and the tree should be discarded.

Diseases and Pests

Most fungous diseases and insect pests can be controlled and eradicated by spraying, and their presence on trees is in itself not a cause for condemnation. On the other hand, the fungous disease silver leaf, which attacks all classes of fruit trees, and the bacterial diseases such as bacterial canker, stone fruit blast, and fireblight are more difficult to control, and any trees infected more than slightly with these diseases should be pulled out; not only are they incapable of revival,

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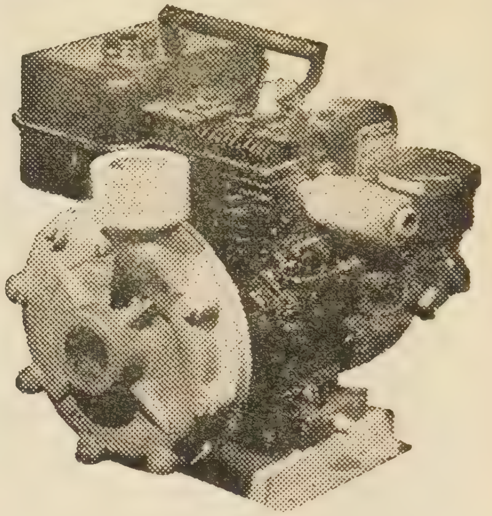

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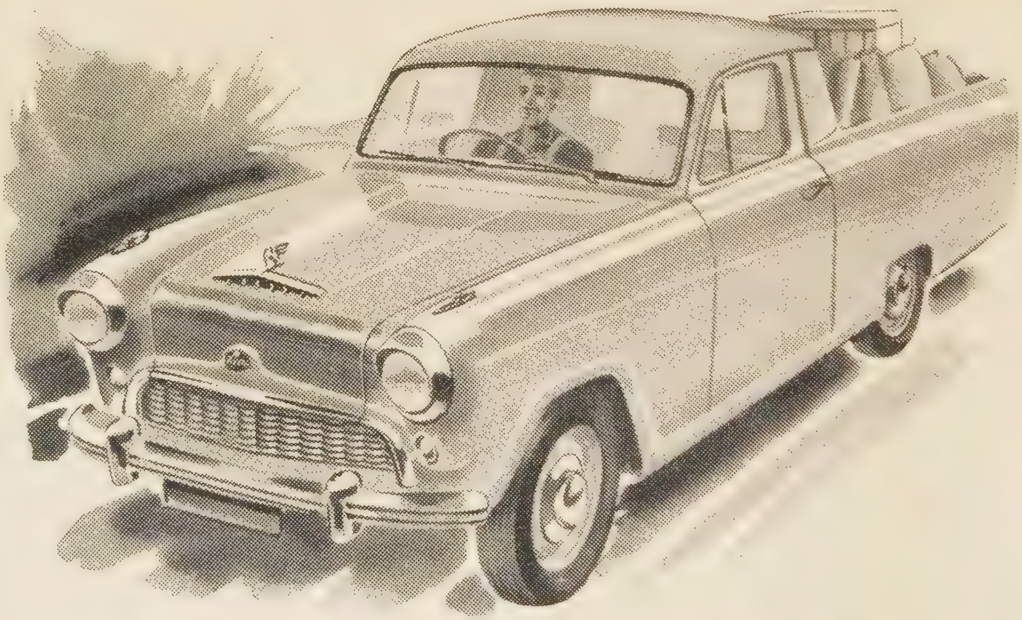

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but they are a serious source of infection for the rest of the orchard. These diseases should be fairly easily recognised from the following brief descriptions:

Silver leaf: As the name suggests, the foliage of infected trees develops a silvery sheen which is unmistakable when compared with the foliage colour of a healthy tree.

Bacterial canker: Infected trees or main branches fail to show life in spring or wither and die soon after growth has started. Dead areas or cankers occur on the trunks or branches, frequently with gumming at the margins. Plums, cherries, and apricots are susceptible to bacterial canker.

Stone fruit blast attacks all classes of stone fruit, particularly peaches, nectarines, and apricots. It is somewhat similar to bacterial canker in its symptoms and is usually associated with gumming. Though it is more prevalent on young trees, old trees also become infected.

Fireblight is a serious disease of pears and quinces, but is seldom alarming in apples. It may be identified from the sudden wilting and consequent death of young shoots, twigs, and blossoms, with the blackened, infected leaves remaining tightly fixed to the twigs. Cankers may subsequently appear around the blackened bases of affected twigs. Gumming may also occur at the point of infection. A minor infection can perhaps be eliminated if all diseased portions of the tree are removed, the cuts being made well below the points where obvious infection starts. Sterilised equipment should be used and all prunings burnt, but any pear or quince tree suffering from extensive die-back and blackening of wood should be suspected, as it is usually beyond cure.

Removal of Trees Unsuitable for Renovation

Trees condemned for any of the above reasons should be pulled out and destroyed. It is not enough merely to chop down condemned trees, particularly those infected with serious diseases. The stumps may remain a source of infection and complete removal is the only answer.

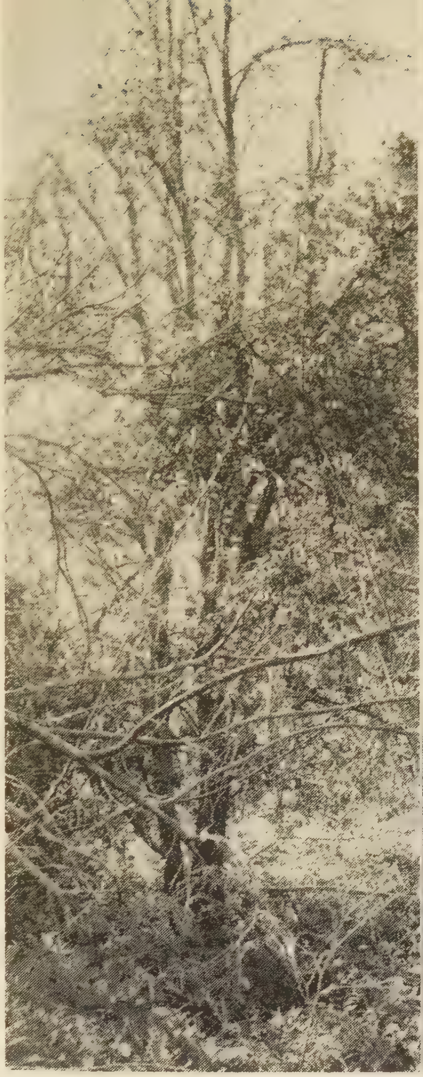
Renovation of Neglected Trees

The best time to begin renovation is when the trees are dormant. The first job should be pruning, followed by a clean-up spray.

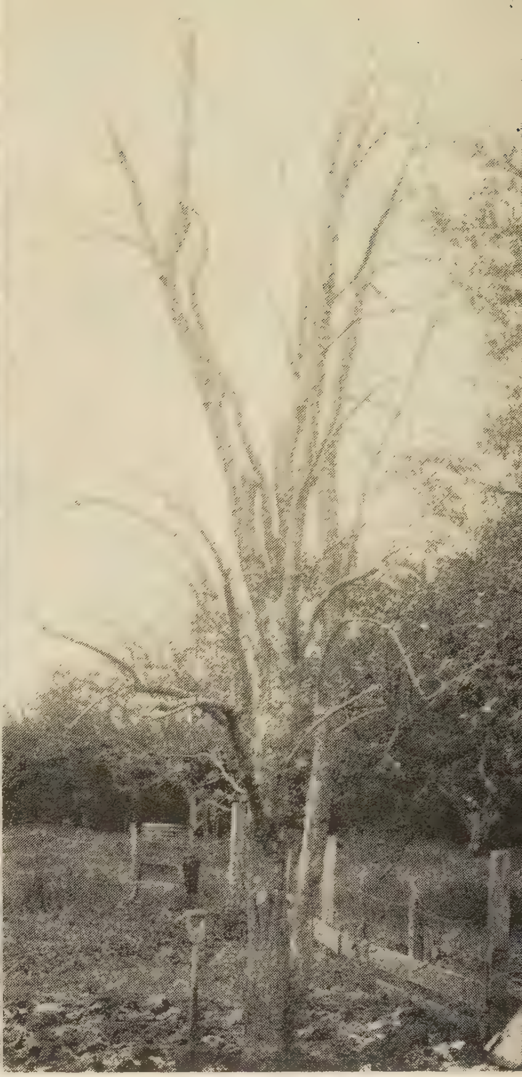
Pruning Pip Fruit Trees

Trees which have become stunted should first have all dead or diseased wood removed and any crowded or crossed branches cut out. The main limbs or leaders should be severely headed back; from a quarter to one-third of their original length should be removed. This treatment may necessitate using a saw. Clean cuts should be made, and the wounds sealed with a good sealing compound. All such cuts should be made immediately above a healthy side shoot or limb. **The cuts should never be made on bare limbs where there is no ultimate growing point**. This may merely result in a dormant stump, with the subsequent growth breaking out still further down the limb.

Side shoots, or subleaders, should also be shortened by about one-third and again cutting should be done to growing points where possible. Lighter lateral growth should be thinned out if overcrowded. The remaining wood, that is, laterals and terminal shoots of leaders and subleaders, should be left unpruned, as this treatment will assist in their development.



A neglected pear tree before pruning.



[*Rendell*

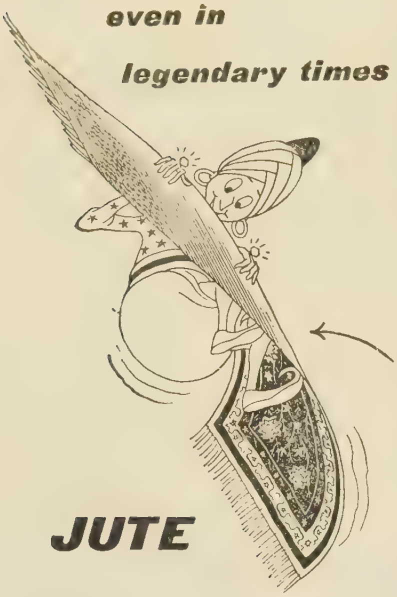
The same tree after pruning.

Trees which are not stunted but which are rather a profusion of untrained wood should be drastically thinned. Up to two-thirds of the branches should be removed, the remaining branches being either left intact or only moderately shortened. Semi-horizontal or oblique growths should be retained in preference to upright shoots, as the former have a greater tendency to settle down into fruiting after heaving pruning. Sprawling branches may be trimmed back for convenience of working, but severe shortening of all such branches should be avoided; otherwise excessive growth will result.

Pruning of neglected pip fruit trees may therefore be summarised as follows:

1. Remove all diseased, dead, and useless wood.
2. Head back leaders and subleaders of stunted trees, and leave the terminal growths unpruned.

even in legendary times



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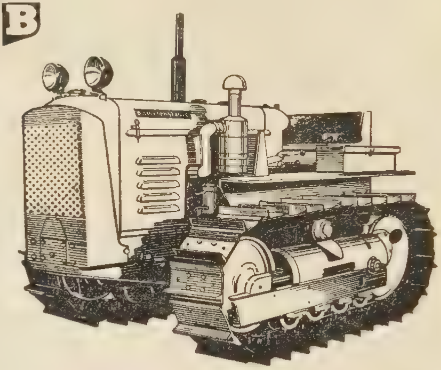

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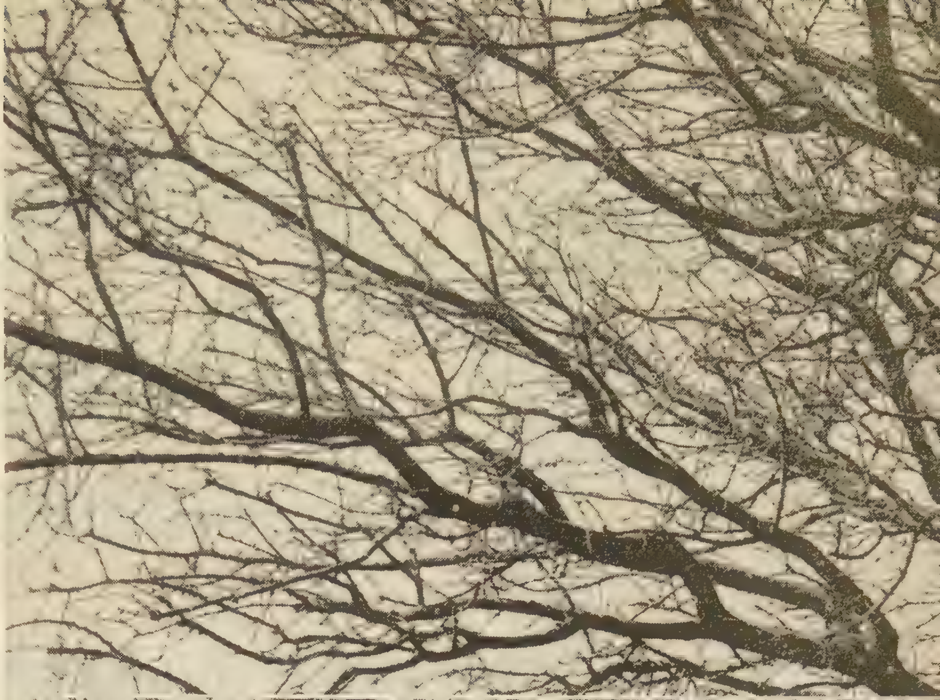
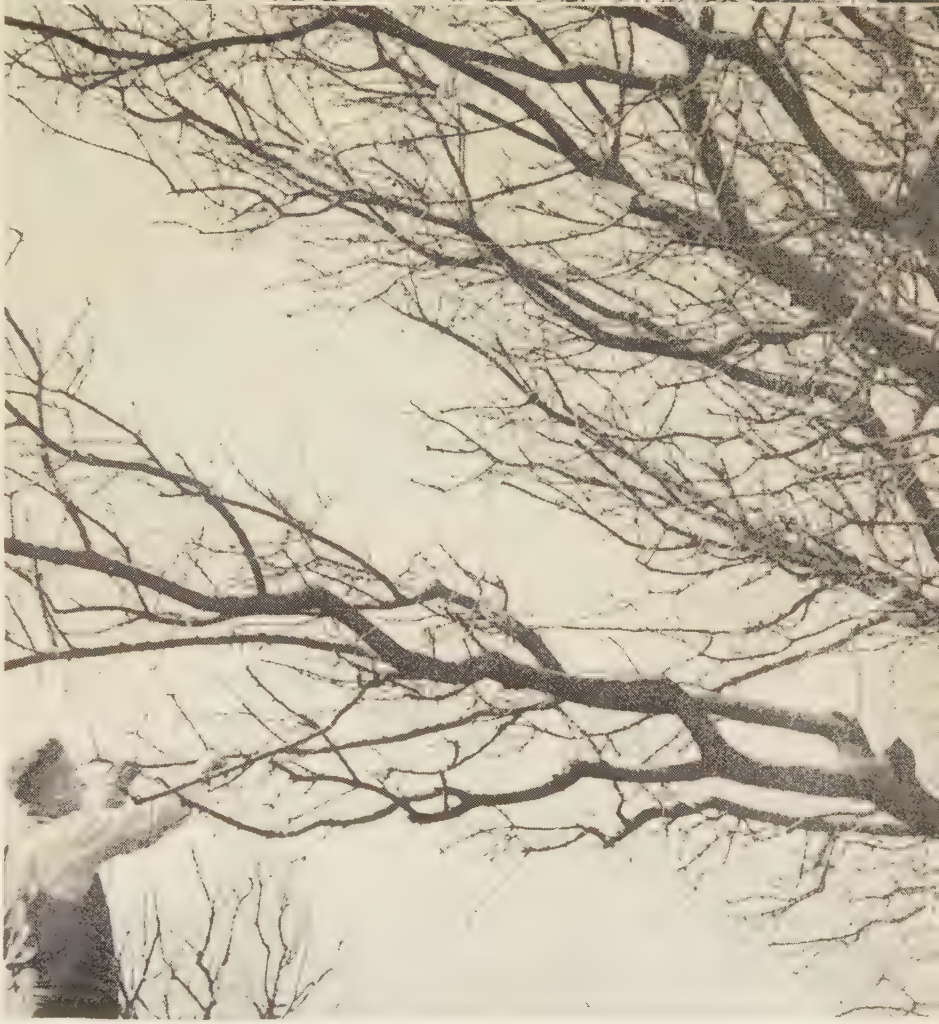
3. Thin out branches on vigorous trees, and shorten back only where deemed essential, and then only moderately.
4. Thin out laterals on both vigorous and stunted trees, leaving the remaining laterals unpruned.

Pruning Stone Fruit Trees

Most stone fruit trees may be treated similarly to pip fruit trees, but peaches and nectarines require special treatment. A neglected peach or nectarine tree usually conforms to a standard appearance: bare leaders and branches, with foliage at the growing tips only. As peach and nectarine trees produce their crops entirely on one-year-old wood, on neglected trees the crop, usually small in size and quantity, is confined to the often inaccessible top branches, these being the only parts with young wood. The principal object in pruning peach and nectarine trees is to encourage them continually to refurnish their entire framework with young growth, which is normally achieved by annual thinning out or shortening of laterals and fruiting arms, and reducing the terminal growth of leaders.



An overcrowded plum tree. →



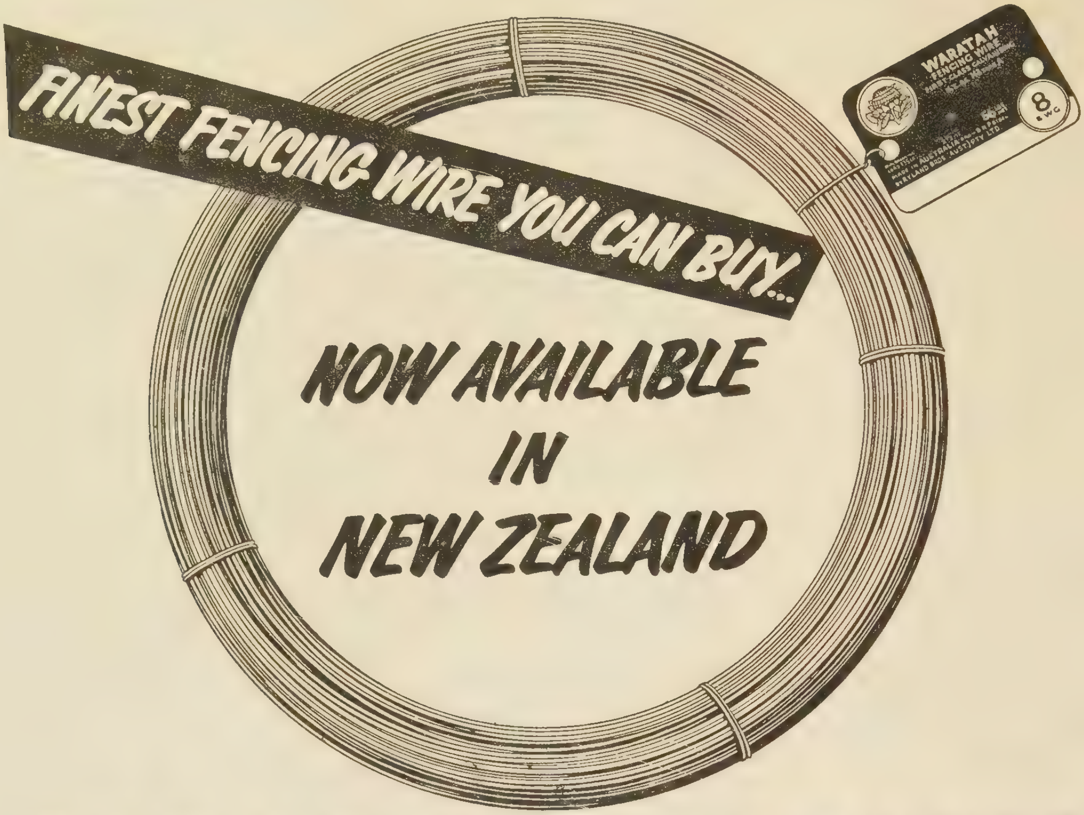
The same tree after pruning. →

[Sparrow

With neglected trees having no lower growing points the only method of restoration is to head back the top growth drastically, each leader being preferably cut back to its lowest growing shoot. This should have the desired result, and young growth may burst lower down even from bare branches which may have seemed incapable of such recovery, but there is a danger with such drastic treatment of old trees. Severely pruned peach and nectarine trees become very susceptible to silver leaf infection, which may gain control in spite of all reasonable precautions. The renovation of an old peach or nectarine tree is, therefore, risky, and success cannot be guaranteed. If a tree remains free of infection the first year after treatment, however, it has a very fair chance of survival and of once more becoming a productive unit.

Orchard Hygiene after Pruning

Pruning of neglected trees should be followed by a thorough clean up of the environs. All prunings should be collected and burnt and the ground cleared of any adjacent undergrowth, and either dug over within the radius of the trees' overhanging branches, or, if grass is growing, this should be cleared from the tree trunks and the balance mown. The trees should be cleared of any loose bark, which may harbour over-wintering insect pests;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this will enable spray to penetrate more thoroughly.

Spraying of Neglected Trees

Immediately after pruning and tidying up the orchard a good clean-up spray should be applied. The recommended spray for this is a double one, to be applied during the dormant season.

First apply lime sulphur (1 gallon to 15 gallons of water).

Then within 10 days spray winter oil (1 gallon to 19 gallons of water). (If woolly aphid is prevalent, add lindane at ¼ lb to 100 gallons to this winter oil.)

This programme should be sufficient to clean up scale insects, over-wintering pests, and fungous diseases. Spraying should be very thorough and right down to ground level, sufficient spray being applied to cause a run-off from the trees.

Subsequent spraying during the season should follow the standard recommendations for the various kinds of fruit trees.

Manuring

Fertiliser requirements will depend on the state of the trees. If the trees are still quite vigorous, manuring should be omitted the first season after renovation or excessive growth may result. If the trees were making little growth, a dressing of fertiliser comprising 4 parts of superphosphate, 4 parts of sulphate of ammonia, and 1 part of sulphate of potash (all parts by weight) should be applied at from 3 to 6 lb per tree, according to size. As an alternative, 5 parts of blood and bone plus 1 part of sulphate of potash could be applied at the same rate. For trees showing moderate to reasonably good vigour slightly less fertiliser need be applied.

THE WELL TENDED ORCHARD

Pruning is the main winter work. Today detailed pruning of fruit trees is not done as much as it was in the past, and the principal aim in pruning, of maintaining a balance between wood growth and fruit production, is often achieved by relatively few cuts—heavy cutting to induce growth, light cutting to encourage fruiting. However, when doing this, care should be taken to ensure that tree hygiene is not overlooked. Otherwise diseased tree parts may still remain intact under this system.

Pruning plays a very important part in the control of diseases. A late infection of powdery mildew in apples, for example, will attack the growing tips, which ordinarily might be left unpruned, providing a serious source of infection the next season, making spray control more difficult and costly. Time spent in tipping diseased shoots and cleaning the tree of infection is well worth while. Experimental work has shown that in the control of powdery mildew careful spraying is less efficacious than careful pruning. Similarly, with stone fruit trees, the removal of twigs infected with brown rot, for example, is the best insurance against an epidemic of this disease in the next season. Detailed pruning to eliminate disease is therefore strongly recommended.

Winter Spraying

A winter oil spray is a good insurance against mite and scale infestation. It should be applied during the dormant season at the rate of 1 gallon to 19 gallons of water.

Orchard Hygiene

The ground around trees should be cleared of diseased prunings and any other harbour for disease such as windfall fruits. Large pruning cuts should be sealed with a good sealing compound to prevent disease entry. If the trees are growing in cultivated ground, this should be dug over now so that winter frosts can weather it.

The Berry Fruit Garden

Pruning of raspberries and black currants should be attended to if this has not already been done during autumn.

Red currants should be pruned in quite a different manner from black currants. The red currant bears chiefly on the fruiting spurs formed on the older wood. The aim should be to produce a bush of six or seven principal branches evenly arranged to form an open centre. Two or three hard prunings annually should be sufficient to obtain this. Subsequent prunings merely amount to cutting the main branches back to an outside bud, and shortening all laterals to develop them into fruiting spurs.

Gooseberry bushes should be pruned to maintain an open centre to facilitate picking. Lateral growth should be shortened to within two to four buds, according to the vigour of the bush. The most popular varieties of gooseberries frequently have a weeping type of growth. The aim in pruning these should be to induce upright growth, and this can be encouraged by pruning all weeping shoots to inside buds, which face upward.

Loganberries and boysenberries: The old, spent fruiting canes should be cut out and burnt, and the new growth tied up and trained to the supports. Only the most vigorous canes should be retained, and these may be trained singly or in multiple cordons along the wires or other supports. Fan-shaped training is a very suitable system, but the tying of several canes together along horizontal wires is an adequate method.

Pruning of Grapevines

Many methods of pruning and training grapevines have been devised, but the cordon system is the simplest method for the home gardener. It consists of maintaining one long permanent rod, which should be spur pruned each year by cutting back to a maximum of two buds all those side shoots or laterals which have grown from the permanent rod. Additional cordons may be developed if there is scope and if the vigour of the vine permits, and replacement cordons may sometimes be necessary, but if the general principle of shortening all lateral growth annually to a maximum of two buds is practised, a productive vine should result.

Racks for Hay Feeding

A CONCRETE yard and racks for feeding hay to cattle in winter and early spring are essential on farms on wet, heavy soils. Pasture poaching is reduced and hay losses through trampling are negligible. Time and labour are saved.

Racks can be constructed from timber, or 1 in. galvanised piping with 8-gauge netting, and can be mounted on concrete or railway iron posts or made portable. Provision of a bin or a strip of bird netting beneath the rack eliminates wastage and mess and forces animals to stand head-on when feeding. Racks can be either single or double sided. Two feet of rack length per cow is ample.

A concrete yard is ideal, though metalled or sawdust areas are used. Racks may be erected on existing yards round the cowshed, but must be kept clean to comply with dairy regulations.

Materials and labour for a concrete yard with pipe and netting racks for a herd of 70 cows would cost about £200; use of existing yards would reduce this figure. It is a good investment on farms where winter and spring pasture management is a problem.

—*G. J. BATTEN,*

Farm Advisory Officer,
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TIMBER

By H. W. T. EGGERS,
Engineer,
Department of Agriculture,
Wellington

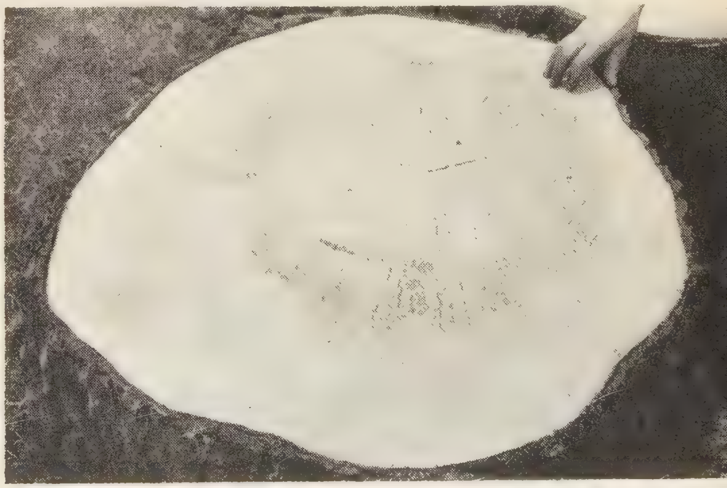
[N.Z. Forest Service

SHELTER, or protection from the elements, is a basic necessity of human existence, and to provide his shelter man uses the material provided by nature and most readily to hand. In the early days of settlement of New Zealand abundant forests made timber the most readily available material to provide shelter, and after a hundred years timber is still our most commonly used building material. Because processing changes natural materials for man's benefit, this two-part article tells how timber can be used with regard to all its characteristics, both natural and imparted. The first part of the article discusses general characteristics of timber, indigenous timbers suitable for building purposes, durability and preservation methods, and strength of timber. The second part, to appear in the June issue of the "Journal", will describe grading and processing of timber.

TIMBER starts as a living organism, a tree. The tree increases its growth each year by adding a complete envelope of tissue, and these layers of annual growth appear as concentric rings in a cross-section of the stem. The tissue of each annual ring varies throughout the growing season from large cells with thin walls (the spring wood) to small cells with thick walls (the summer wood). Spring wood is light in colour and summer wood dark. A young tree grows rapidly, adding wide rings each year. As it grows in height and girth the new annual tissue must cover a greater area and the rings become thinner. Thus very large, old trees show extremely narrow rings near the bark.

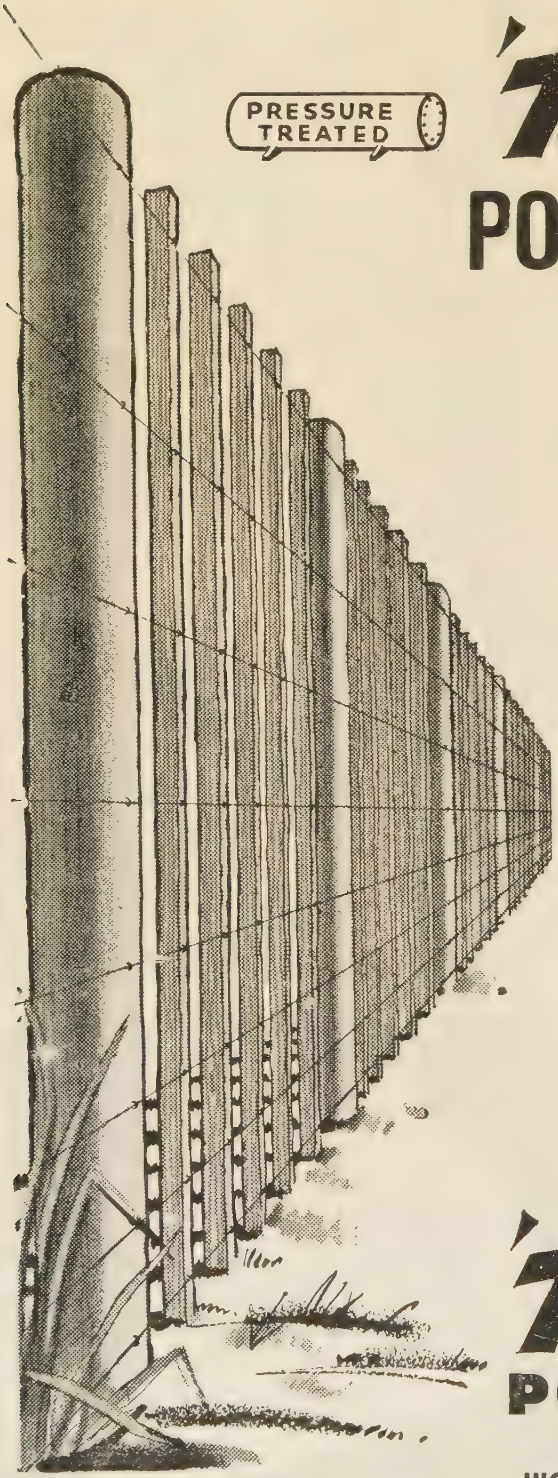
Sapwood is a layer of many annual growth rings forming the outer circumference of the tree under the bark. The thickness of the sapwood layer varies with the species; in some trees in New Zealand it is several inches thick. Sapwood cells are living cells and transport food and water between leaves and roots.

Heartwood is the portion of the tree inside the sapwood layer. Annual rings of heartwood were formerly rings of sapwood, but the cells have become filled with minerals and no longer play an active part in the life



Cross - section → of a tree with 40 years' growth indicated by annular rings and showing the different colours of heartwood and sapwood.

fence for time with . . .



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of the tree, except for support. Heartwood is darker than sapwood.

The illustration on page 473 shows a section through a tree with 40 years' growth indicated by annular rings; also shown is the difference in colour between heartwood and sapwood.

Young branches originate in the cambial layer of the inner tissue of the trunk, and each layer of annual growth covers the trunk and branches like a sheath. As long as the branch is a living part of the tree the annual growth rings over the branch are a continuation of those over the trunk and the branch at this time is "intergrown"; as the tree gains height and adds new branches at the top the older, lower branches die for lack of sun. Rings of annual growth grow to the dead branch but not over it as when it was alive. Eventually the branch breaks off and as successive layers of growth are added to the trunk the stub of the branch is finally submerged and covered. Additional layers formed beyond the end of the stub are all clean wood. Thus intergrown knots, encased knots, and clean wood are formed.

Strands of the thick-walled wood cells or fibres of most trees grow erect, following the axis of the tree, but infrequently the fibres coil spirally around in the tree. Sometimes the spiral grows in one direction for part of the life of the tree, then straightens, and then leans backward to spiral in the other direction. The cause of such growth is unknown, but it is characteristic of certain species and has an effect on the quality of the timber.

An intergrown knot and twisted grain are shown on this page.

Grading of Timber

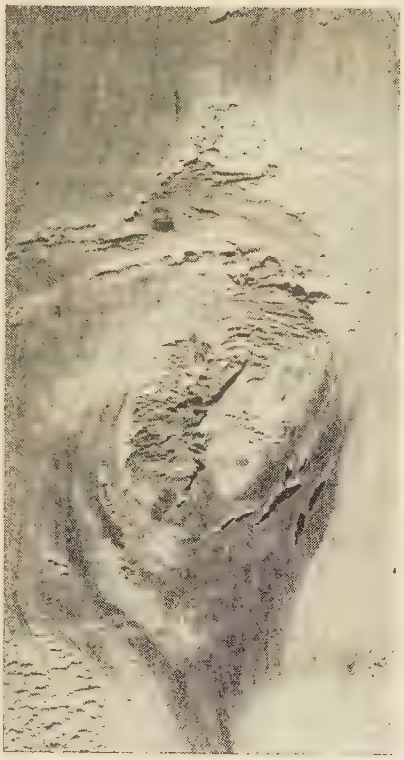
All the growth characteristics described are considered when timber is graded. The relative thickness of the summer-wood portion of an annual ring is a gauge of strength because of its greater density.

Rate of growth is also a measure of strength, as wide rings of thin-walled cells lack density. Sapwood is as strong as heartwood, but less durable. The size and location of knots are factors in structural and other grades. The character of the knots, whether tight (intergrown) or loose (encased), is considered for appearance as well as for general use. The sharper the slope of the grain, either spiral or diagonal, the weaker the piece.

Diagonal grain usually results when timber is cut straight from a tapering tree trunk.

For many years timber has been standardised in sizes commercially available to the average buyer, and in 1938 a standard specification was issued for the grading of the common indigenous softwoods used for building. This specification, amended to cover radiata pine for both framing and finishing grades, has now become the National Grading Rules, under which virtually all timber produced in New Zealand is sold.

Details of National Grading Rules will be given later.



An intergrown knot.

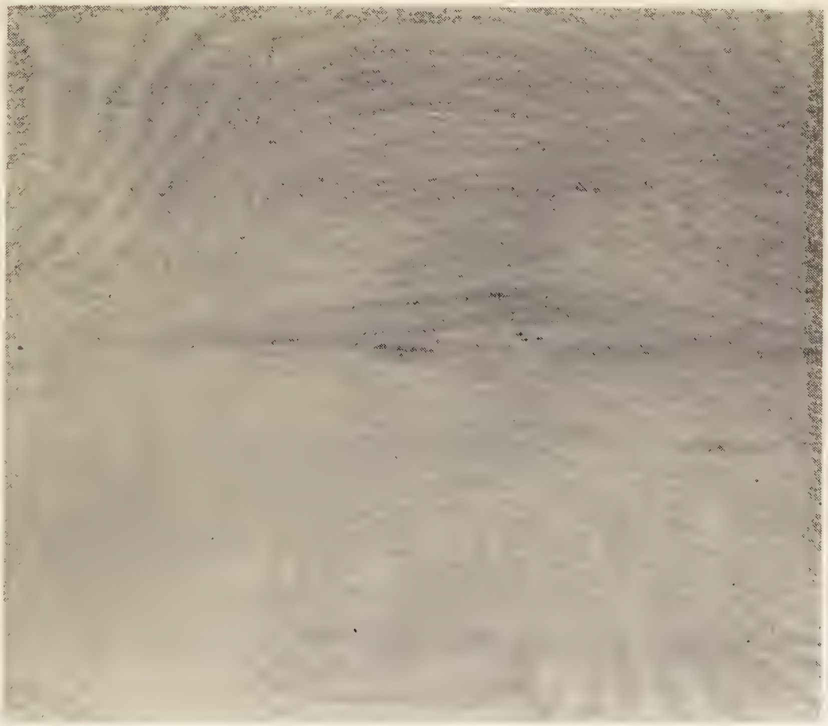
Classes of Timber

From the early days of New Zealand's history the main sources of supply of building timber have been the readily available indigenous softwoods such as rimu, miro, matai, and totara, and in certain districts other timbers which are more prevalent, such as kauri in the north and beech in the south.

The large amount of milling and the destruction of native forests to provide farm lands are rapidly exhausting this supply of timber and use must be made of the quick-growing exotic pines which have been planted on what would otherwise be waste land. Growth of large areas of these exotics has now reached the stage where an organised system of cutting and replanting assures a continuous supply of timber for future building, a supply that can be increased as native timbers become more scarce.

With the decrease in supply of native timbers the time will come when one timber only (pine) will be available for all parts of any structure and it will not be possible to choose

↓ Twisted grain.



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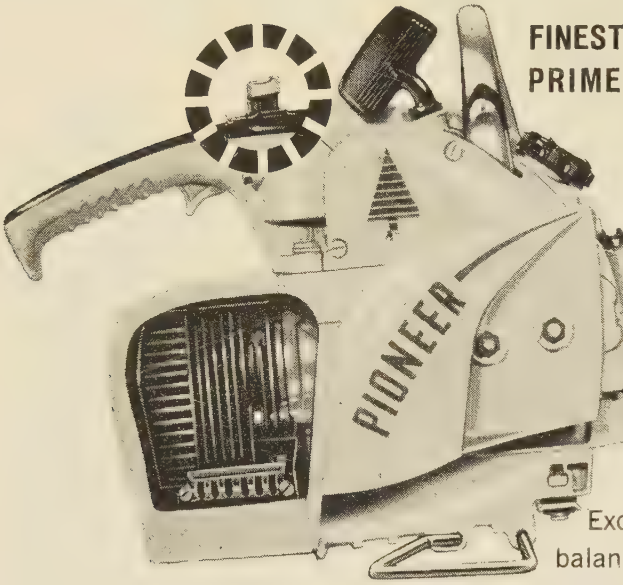

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Displacement: 5.45 cubic inches (90.6 cc).

Primer Pump: Injects fuel into the carburetor with a flick of the thumb.

Bar: New "Durarail" guide bar. Stellite tip . . . sizes 12 in., 16 in., and 20 in., (30.48 cm., 40.64 cm., 50.80 cm.)

Chain: .4 pitch planer type; speed 1850 FPM at 4200 RPM engine speed.

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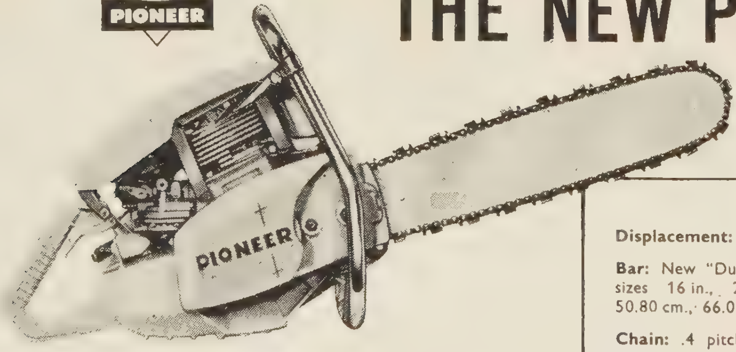

SPECIFICATIONS

Displacement: 6.27 cubic inches (100.5 cc)

Bar: New "Durarail" guide bar. Induction-hardened, stellite tip sizes 16 in., 20 in., 26 in., 28 in., and 32 in. (40.64 cm., 50.80 cm., 66.04 cm., 71.12 cm., 81.28 cm.)

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For information about the Pioneer "410" and "610" chain saws see your dealer or write Outboard Marine International, Dept. P 23-2, Box 830, Nassau, Bahamas—world distributor of Pioneer Chain Saws, Johnson, Evinrude, and Gale Outboard Motors, Lawn-Boy Power Mowers and Cushman Utility Trucksters.

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P36-5

varieties best suited to particular applications as is customary at present.

However, this lack of choice of timbers with natural characteristics need not be detrimental, as equivalent strength and durability can be obtained for pine by changed construction techniques and modern preservatising processes.

Suitable Indigenous Timbers

As native timbers, though in short supply, are still available and some choice of varieties is still possible, the following list of indigenous timbers suitable for building is included. It also includes varieties not normally available from commercial sources to enable the farmer who is felling his own timber and having it milled to determine which timbers are most suitable for various uses.

The list gives general and particular uses for which the timbers are suitable:

Kauri: "Mediums" and "seconds" (containing sapwood) are used when available for general uses in interior building and furniture, and the heartwood's high qualities (straight-grained, strong, even-textured, and easily worked and finished) make it suitable among other uses for vats, churns, sink benches, and laundry appliances.

Rimu: For most above-ground and interior building construction, plywood, and furniture.

Miro: Resembles rimu, for which it is often marketed; is stronger and harder, but more liable to warp if carelessly seasoned.

Matai: The hard and even-wearing properties of the heart timber make it the most suitable timber for flooring and also for desking and sills, and sapwood grades treated with preservative are used for weatherboard, plywood, and tallow casks.

Totara: The heart timber, being light, straight-grained, free from warping, easily worked, and exceptionally durable, is suitable for piles, exterior joinery, and construction; the pale-brown sapwood is more durable than that of other indigenous softwoods and is suitable without preservative for many constructive uses where softness and brittleness are no objection; for fencing posts.

Tawa: A hard, straight-grained, strong, but not shock-resistant timber, with excellent finishing qualities; is suitable for interior woodwork and flooring, furniture, and turned products; it should be kiln dried green and treated to give immunity from attack by powder post borer.

Timber decays only where it is exposed to both ground moisture and air.

Kahikatea: Its odourless character formerly made it exclusively suitable for dairy produce containers, but it is now available for use in miscellaneous woodware, vats, cheese crates, furniture, and (with preservative treatment) in house building. Natural heartwood of the hill-grown "yellow pine" type is durable and a useful substitute for heart kauri.

Tanekaha is an alternative to rimu and matai for building and to Douglas fir for haymasts, hayrakes, and battens.

Silver pine: A straight-grained, easily worked, and very durable timber used in cabinet work and for fencing posts and poles.

Southland beech: Strong, easily worked, not durable; can be used for flooring and interior finish, agricultural implements, tool handles, dowels, barrels, cheese crates, and furniture.

Black beech: The heartwood is very durable and suitable for fencing timber and bridging; the sapwood for dowels, handles, and, in some grades, for building timber. It rapidly blunts the saw because of silica content.

Red beech: An even-wearing timber which when well seasoned can be used in house construction for flooring; for furniture and fencing and for bridge timber.

Mountain beech: Used as a substitute for silver beech and as a tough, straight-grained, even-textured timber for flooring and general building, or gates, trucks, and implements.

Mangeao: A tough and strong timber useful for tools, coach finishing, and wheelwright's work.

Kohekohe: Useful for furniture and interior finish.

Rewarewa: Heavy and strong and can be used for rails, blocks, swingle trees, tool handles, and interior furnishing.

Pukatea: Though light, the timber is strong and tough and can be used for roof boards, weatherboarding (if preservative treated), and battens.

Kaikawaka: A light timber of poor strength and difficult to burn, it is suitable for interior finish and fireproof items and is also fairly durable for use as poles and posts.

Durability of Timber

Unlike other structural materials previously considered more durable, timber is subject to decay and attack by insect pests and fungi. This is because it is formed of vegetable cells and fibres produced by chemical action during growth. Once this chemical action is stopped and the cells and fibres become dead the living substance's natural resistance to decay ceases and susceptibility is increased.

In any living substance age decreases the natural resistance to decay and disease, and this applies equally to trees.

The rate of decay of timber depends on physical factors related to the class of timber, the climate (subjection of the wood to moisture and temperature), and the prevalence of wood-boring insects. When there is a choice of species these factors can be partially offset by the choice of a particular, most suitable species, a choice which will reduce the rate of decay to a minimum and so ensure reasonably long life for timbers used for building.

Decay is directly related to the moisture content of timber, for which "fibre saturation" is the prime measuring point. Fibre saturation is explained as the moisture content above which there is free water in the cell cavities and below which the remaining moisture is in the wood substance. It is an important moisture content level, because decay will not live at less than fibre saturation and shrinkage begins at this point.

Timber decay is produced by fungi which beside needing air for their life thrive on wood substance made palatable by moisture. If moisture is so excluded that the moisture content is lower than fibre saturation, decay will be prevented; conversely if moisture is included but air excluded, decay will again be prevented, because the fungi cannot thrive without air. An example of this is totara piles used in building. They remain sound in the ground where excluded from the air but subject to ground moisture, and sound above ground where exposed to air but dry; the timber decays only where it is exposed to both ground moisture and air as shown in the illustration on this page.

When increasing scarcity of different species reduces the choice of timber it will be necessary to rely more and more on protective and

Everything's under control . . .

What a fine figure of a scarecrow he is! Although bird traffic seems somewhat slack at the moment, who can doubt that those vast white gloves are capable of dealing with any emergency. Unfortunately, his command of the situation does not extend to the other pests of growing crops — the insects, the fungus spores and the weeds. To keep *them* under control the best weapons are agricultural chemicals from Shell.

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preservative treatment to provide the decay and insect resistant qualities not normally possessed by the species available. The difference in the relative strengths of the various species to meet the requirements of loading is not such an important factor, as within economical bounds strength can be increased by increasing sectional area.

Appearance, which in the past has been a factor affecting the choice of timber for finishing grades, has ceased to be a factor with the use of modern veneered plywoods.

All materials are subject to attack by destructive agents, and most require protection from them. There is ample historical evidence of the permanence of wood when protected from such destroyers as fungi, insects, marine borers, and rodents. The particular protection and the amount required depend on the service conditions involved and may be provided by proper construction, by selection and use of naturally resistant species, by preservative treatment, and by other means.

So far as is known the lignin, cellulose, and other constituents which make up wood substance are not chemically changed or lost with time when wood is adequately protected from the elements and other destructive agencies, though the colour of wood may be slightly changed by long-continued exposure to air. Possibly this change of colour results from oxidation of substances which are not parts of the wood substance.

Since wood is variable, the effect of time cannot be accurately appraised by tests of wood from old structures, as the original strength of the material is unknown. The evidence of such tests which are recorded is that no significant loss of strength has occurred in the absence of the destructive agencies mentioned.

Timber Preservation

As mentioned above, the fungus which produces decay in timber can be destroyed by eliminating its nutrients of air and moisture. This, however, will not remove the deterioration caused by wood-boring insects.

Modern methods of timber preservation, however, by making the substance poisonous not only inhibit decay fungus but also the wood-boring insects. Preservation, therefore, depending on the preservative used and its method of application, can remove the principal disadvantage of timber as a structural material—its proneness to decay and insect attack. This proneness has in the past precluded the use of timber for many types of construction. Concrete and steel have generally been used in these cases, but with suitable preservation timber can now frequently be used to advantage.

Another recent development—the inclusion of fire-resistant chemicals—has removed a disadvantage of using timber as a structural material, and with the preservation techniques has completely changed the field of its usefulness, and it can now be classed as being as durable as steel and concrete.

Though preservation by painting assists in prevention of decay by controlling the fungus nutrients, it does not prevent insect attack, as insects penetrate into the core of the timber through external cracks and shakes not filled by paint.

All structural materials have their spheres of usefulness, which depend firstly on their suitability for particular purposes and secondly on the architectural or aesthetic requirements. For example, the tensile characteristic of steel makes it best suited for stressed members and the compressive characteristic of concrete makes it best suited for carrying compressive loads. Timber can be made suitable for tension or compression, for example, laminated for truss chords in tension, and for mining pit props in compression.

As a result of a report of a Committee of Inquiry into timber preservation the Government, under the Timber Preservation Regulations 1955, constituted the Timber Preservation Authority, which is empowered to supervise effective treatment techniques and register all timber treatment plants.

The functions of the Authority are to:

(a) Authorise timber preservatives for use in New Zealand;

(b) Authorise processes by which the preservatives are applied to the timber;

(c) Prepare specifications of the methods to be used in applying various preservatives by various processes;

(d) Prepare standard charge sheets for both pressure and diffusion processes;

(e) Compile a register of all treating plants complying with the Authority's requirements;

(f) Inspect plants before authorisation to establish their ability to treat timber satisfactorily;

(g) Decide on the branding and marking of treated timber;

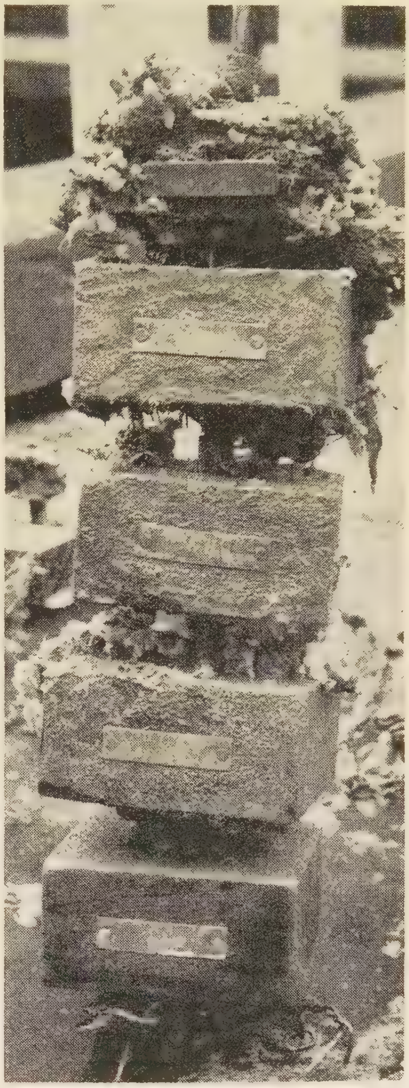
(h) Collect and test samples of treated timber from time to time to check that the required standards of treatment are being maintained;

(i) Confer with representatives of treating organisations and suppliers of approved preservatives to discuss technical and administrative matters.

With this Authority controlling timber preservation timber users cannot be exploited by unscrupulous suppliers and can be assured that any treatment conforms to the high standard set by the Authority.

Amount of Preservative

The most important item in a specification for preserving timber is the amount of preservative to be used and



[*"Evening Post"*

Test specimens of radiata pine which were treated with copper chrome arsenate preservative and submerged in sea water for three years three months. From top to bottom—Untreated, a failure because of heavy damage by gribble crustacea and teredo worm; treated with $\frac{1}{2}$ lb of preservative per cubic foot, light gribble damage on the edges; 1 lb of preservative per cubic foot, sound; 2 lb of preservative per cubic foot, sound; 3 lb of preservative per cubic foot, sound. There is an almost total absence of marine growth on the bottom specimen.

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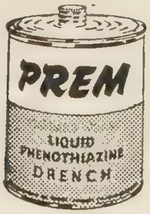

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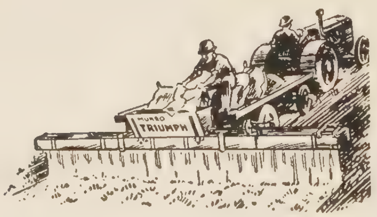

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this is usually defined as the weight of the preservative retained in 1 cub. ft. of the timber after treatment.

Those responsible for deciding this figure for the various preservatives try to set the amount of preservative retained at the minimum figure satisfactory for the end use of the timber. This is sound economics, as it is waste to use more preservative than is required. For example, timbers not in contact with the ground may be satisfactory with about half the preservative used for timbers in contact with the ground.

Most suppliers will provide timber suitably preservatised for specified usage, and the buyer should specify the use for which timber is required.

The chemicals used for timber preservation vary in suitability for the conditions under which the timber is to be used. Some preservatives have greater tendency to leach than others, that is, water can wash the preservative salts out of the outside layers, leaving them prone to decay, the action becoming progressive through the timber. The salts of some preservatives become chemically "fixed" with the substance of the timber, which prevents leaching, and it is these preservatives which are most suitable for timber to be subjected to severe conditions such as continuous immersion in water.

The degree of retention, that is, the amount of preservative retained in the timber, can be regulated to make such timbers as radiata pine, which normally would be totally unsuitable for continuous immersion in water, quite suitable for this.

Tests of radiata pine immersed in salt water show that though its maximum life untreated is less than 12 months, its resistance to marine borers can be very considerably increased by adequate loadings of suitable wood preservative.

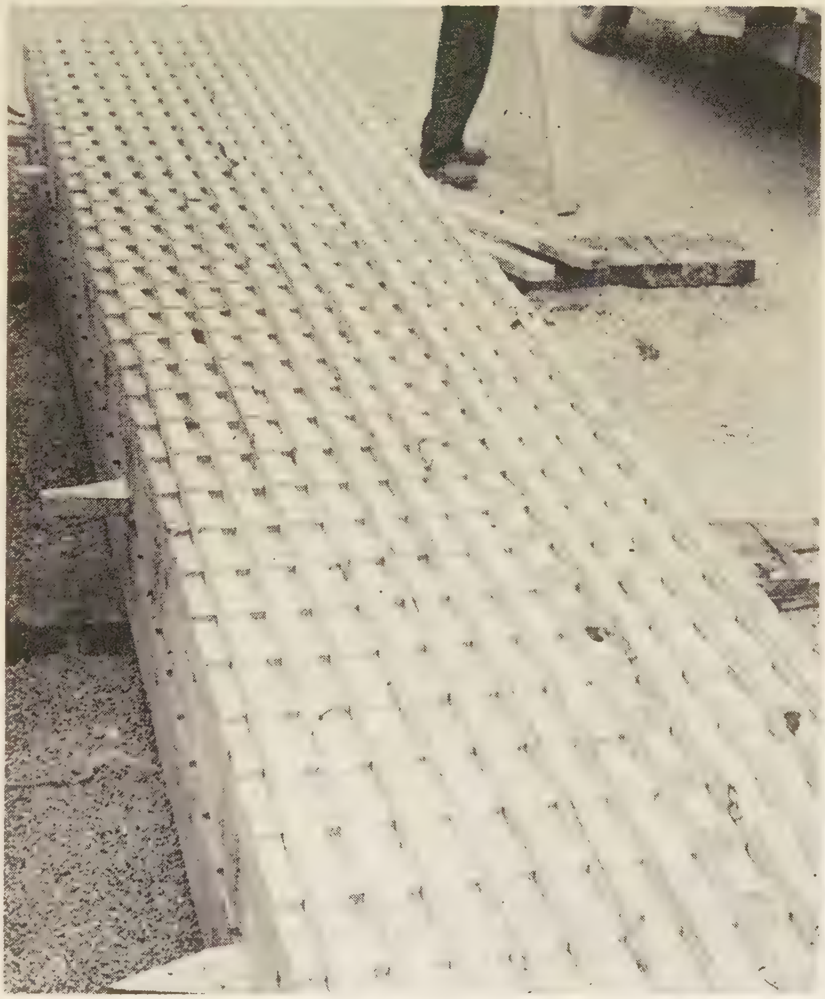
The illustration on page 479 shows the results of tests of timber samples submerged for long periods in salt water. In the past it has been necessary to use the more resistant species such as Australian hardwoods for the extremely severe conditions of marine use, but modern preservation techniques can make all species equally resistant to destruction.

Radiata pine, which was previously considered an inferior species, is now being preservatised and used for marine work, water cooling towers, river rivetments and groyns, punt sheathing, bridge decking, and numerous other purposes under severe conditions.

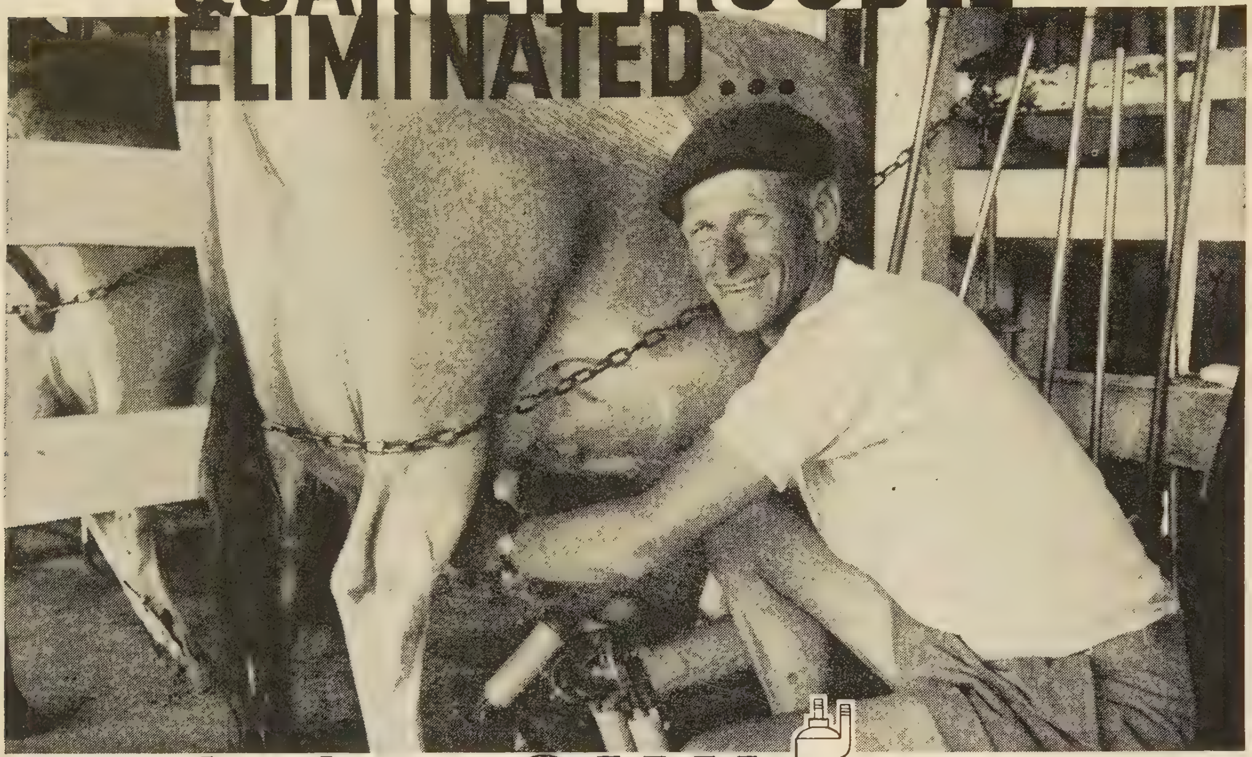
The upper illustration on this page shows preservatised timber used for sleepers by British railways.

Railway → sleepers in Britain made from preservatised timber.

↓ Laminated timber decking for a bridge over which a concrete roadway will be laid.



QUARTER TROUBLE ELIMINATED...



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Says Mr. C. Wooding,
No. 4 R.D., Morrinsville

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Yours faithfully,
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A joinery factory in which the trusses for its wide-span roof are made of laminated timber.

Strength of Timber

As suitability of materials for structural members is governed by their characteristics, of which strength is probably the most important, timber in the past has not been used where high tensile strength is required, as the quantity needed, compared with the quantity of steel necessary to provide the required strength, made its use uneconomic.

However, modern lamination and fastening methods have removed this handicap and timber can now be fabricated into trusses for bridge or roof construction where steel was previously considered the only suitable material. The lower illustration on page 481 shows laminated bridge decking over which a concrete roadway will be laid and the illustration on this page shows the wide-span roof of a joinery factory with laminated timber trusses.

Sound wood from trees killed by insects, fungi, wind, or fire is, unless the tree has been unduly checked, as good for structural purposes as that from trees that were alive when cut. When the utility of timber from a dead tree is considered it is helpful to remember that the heartwood of a living tree is entirely dead, and that in the sapwood only a fraction of the cells is alive. The important consideration is not whether the trees from which timber products are cut are alive or dead, but whether the products themselves are free from decay or other defects which would make them unsuitable for use. This can be determined by careful inspection.

American tests indicate that resin in some of the conifers may slightly increase some strength properties, but the effect is too small to be of any practical significance. Too much resin is sometimes associated with an injury such as a compression failure that may have greatly reduced the strength of the particular section.

The shrinkage that occurs in the drying of wood induces internal stresses. In time equalisation of differentials of moisture content combined with the action of wood as a plastic material relieves such stresses. This effect would tend to increase the resistance to external forces, but probably it is not great enough to be significant in most uses of timber.

Comparative strength tests on kiln-dried and air-dried timber show that good kiln drying and good air drying have the same effect on the strength of the timber.

The moisture content of timber when it leaves a kiln is probably lower than that of thoroughly air-dried stock. Since most strength properties of wood increase with loss of moisture, kiln-dried wood may be stronger than air-dried wood. Such a difference in strength is not permanent, since in use timber will come to practically the same moisture condition whether it is kiln dried or air dried.

ROUND THE RESEARCH STATIONS

Current Work and Findings in Department of Agriculture and Department of Scientific and Industrial Research Trials and Experiments

Ruakura

Milk Production in Beef Cows

An experiment has been designed at Ruakura Animal Research Station to provide basic information on the milk production of the beef cow and its importance on the rate of growth of the calf.

The cattle are from high-quality herds consisting of Aberdeen Angus, Hereford cross Aberdeen Angus, and Aberdeen Angus cross Jersey heifers and have been divided into two herds. One herd is rearing its calves as in a normal beef herd, with observations being taken at fortnightly intervals on the suckling behaviour of the calves. The other herd is being used for Plunket feeding. The calves are separated from the cows and allowed access to them only twice a day, being weighed before and after each feeding to determine the amount of milk consumed.

From the results it is hoped to determine whether it is worth while to improve the milking ability of our beef cows and to get some measure of the importance of nutrition in the growth of the calf.

Wallaceville

Radioactive Selenium

Radioactive selenium is being used to study the role of this element in animal health. Results so far show that the proportion of selenium absorbed by the sheep is high. Apparently selenium salts become converted to an organic form of the element in the alimentary tract and it is probably this form which is effective in treatment of ill thrift and other selenium-responsive diseases.

Invermay

Use of Fertiliser Nitrogen

Trials are in progress at Invermay Research Station to investigate the English and Continental practice of using heavy dressings of nitrogenous fertiliser on pastures. An ammonium nitrate-lime mixture has been applied to various pasture mixtures at rates ranging up to 12 cwt per acre, and production and sward composition data are being recorded under high- and low-fertility conditions.

Results to date indicate that while heavy dressings of nitrogen may give large increases in dry matter, particularly in out-of-season production in the first year, clover growth is generally thin and poor, with the result that subsequent pasture production is adversely affected. This effect has been particularly noticeable under low-fertility conditions.

The use of intermediate rates of nitrogen (4 cwt per year) has not appeared very promising to date. This rate is insufficient to give a high yielding all-grass sward and detrimentally affects clover growth and hence production in the later stages.

Wallaceville

Cobalt Bullets

A number of trials by field officers of the Department of Agriculture have shown that, in the absence of cobalt deficiency, bullets cause small reductions in growth rates of lambs in some cases. It is not yet known whether this effect is due to the bullet itself or to the cobalt contained in it. Experiments to investigate this have been started.

Wallaceville

Trace Element Inter-relationships

It is now well known that while molybdenum can in many instances greatly increase the amounts of feed produced, this element must be used wisely. Otherwise it may cause copper deficiency in stock. Other inter-relationships between trace elements probably exist, but are still largely unknown.

At present a possible relationship between the effects of cobalt and selenium, both of which will, in appropriate circumstances, improve the thrift of sheep, is being investigated. It has been shown that selenium doses have no apparent effect on the cobalt (vitamin B_{12}) status of sheep. Experiments now in progress will show whether storage of selenium in animal organs is modified by giving extra cobalt.

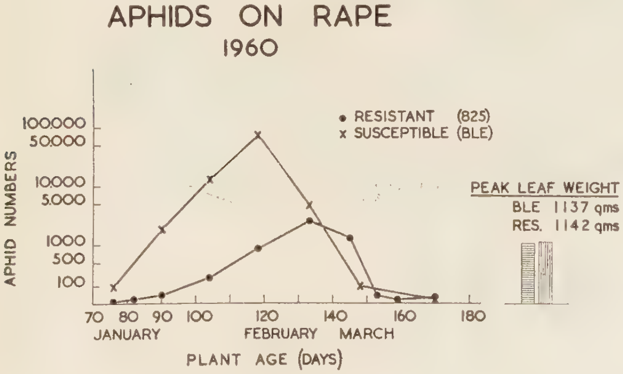
Crop Research Division

Aphid Resistant Rape

Plant breeders are often asked to produce a plant resistant to some disease or pest. This happened in Canterbury, and after several years of breeding and selection seed has recently been released of the new Aphid Resistant rape, bred at Crop Research Division.

In producing a resistant line plant breeders select survivors in the field. They thus select those plants which survive best in the circumstances, that is, those that are most resistant to the total complex of adverse conditions. In this case the breeders have selected plants which resist both aphids and the virus diseases which they carry.

Since the Entomology Division Station shifted from Ashburton to Lincoln, it has been possible for entomologists to examine in detail the resistance of Aphid Resistant Rape to populations of the cabbage aphid. This variety was included in plots on which aphids were counted at intervals during 1960 at three sites in Canterbury. Broad Leaf Essex rape was also included and this gave a direct comparison of aphid build-up on the two varieties. The graph below shows the comparison of growth and totals of aphid numbers on 30 plants sampled every 14 days at one of the sites, Lincoln.



Peak leaf production was approximately the same for the two varieties, though the new line was a few days behind Broad Leaf Essex in reaching the peak. Aphid numbers have been plotted on the graph on a logarithmic scale. Successive intervals on this scale correspond to a ten-fold increase in aphid numbers.

At the peak of invasion on Broad Leaf Essex plants actual totals for the 30 plants sampled were: Broad Leaf Essex 69,324 and Aphid Resistant 857. For every aphid on Aphid Resistant rape, there were about 80 on Broad Leaf Essex. The plant is also virus tolerant under field conditions.

Wallaceville

Rabbit Poisons Safer for Stock

A disadvantage of 1080 as a rabbit poison is that it is more toxic to sheep than it is to rabbits when equal body weights of these animals are considered. A British scientist has reported recently his isolation of a poison related to 1080 which he states is considerably more poisonous to rabbits than to sheep.

Wallaceville Animal Research Station is endeavouring, with the help of a commercial chemical organisation, to have some of the new compound and three others related to it prepared synthetically in Great Britain with a view to testing them for their suitability for rabbit poisoning and to see whether any of them would make rabbit poisoning safer for sheep and dogs.

The ultimate aim of such studies is to find a poison of such properties that rabbits can be poisoned without the necessity of removing sheep from the country, or as a lesser objective to shorten the time for which sheep must be kept off poisoned country.

Wallaceville

Iodised Oil Prevents Goitre in Lambs

At Manutuke Research Station single injections of poppyseed oil containing iodine given to pregnant ewes on thousand-headed kale three to four months after tupping prevented high death rates due to goitre among their lambs. At present the iodised oil is rather too costly for most purposes. Until a cheaper substitute can be found two doses of iodine salts given by mouth three months and again four months after tupping are recommended for pregnant ewes grazing brassica crops for several weeks before lambing.

Wallaceville

Copper has no Effect on Cobalt Deficiency

Experiments at the Winton Experimental Farm, Southland, showed that dosing with copper conferred no benefit on cobalt-deficient and cobalt-dosed lambs. Copper failed to alter the vitamin B_{12} content of livers.

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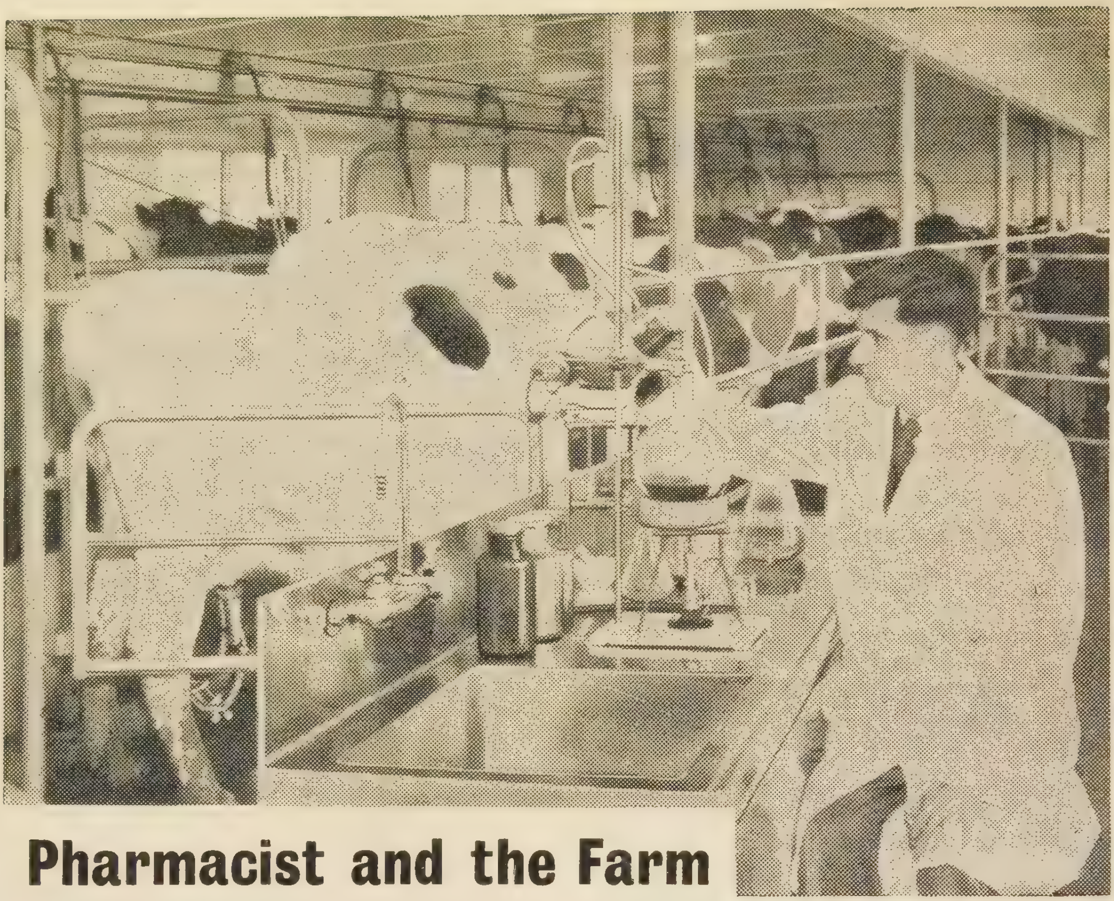

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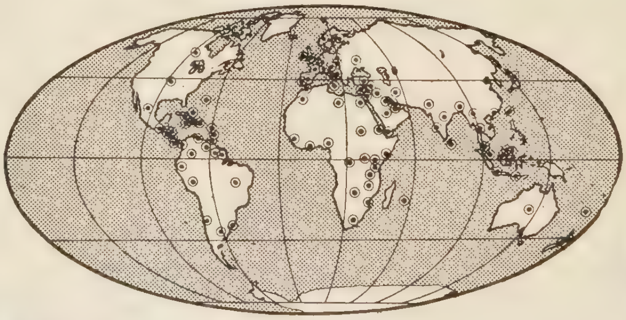

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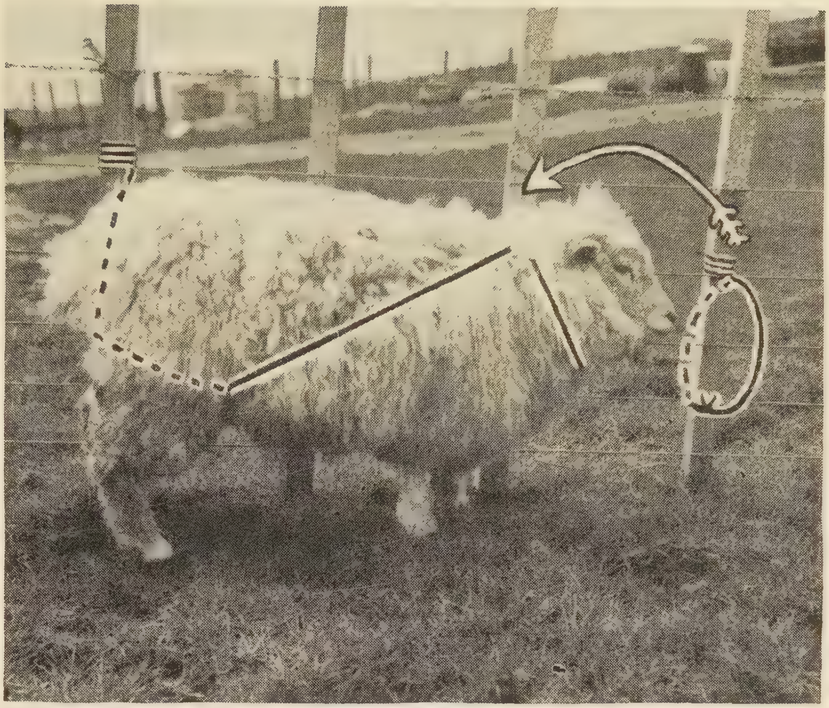
Mothering-up Method for Ewes and Lambs

By A. K. BOOTH,
Farm Advisory Officer,
Department of Agriculture,
Wanganui

A MOTHERING-UP method used by a shepherd on the hill country farm of Mr L. C. Soler at Mt. Curl, Marton, achieved such outstanding results that it is now normal practice on the farm. On easy country various methods can be used, and many farmers provide special mothering-up pens to which both ewes and lambs are carried, but on country unsuitable for tractors or vehicles it is more difficult to find a method of mothering up that will be highly successful. The method described here should be useful in such circumstances, but can also be used with as much success on sheep farms other than those on hill country.



The method of tying the ewe to the fence as described in the article. Because the neck loop is attached to the batten behind the ewe's shoulders, the method of tying it is shown for greater clarity on the batten in front of the ewe. The dotted lines represent the parts of the rope hidden by the ewe.

THE ewe is taken to the nearest fence and is stood side on against the wires. An 8 ft length of light rope is tied at one end in a bowline knot around a batten at the level of the second wire from the ground. The rope is brought around the outside of the ewe's neck and attached to the same batten at the level of the fourth wire. It is then taken down across the top of the outside shoulder of the ewe, under the outside back leg between the udder and the leg, and tied on to the nearest batten at the level of the fourth or fifth wire just above the sheep's rump.

No Danger of Choking

The ewe's neck is held against the fence firmly without any danger of choking. Some practice is needed to get the right tension on the rope, and though the ewe is held firmly, she is quite comfortable and can squat. Above the ewe's neck the rope is not tied but wound round the batten several times and then brought back under the wire before being taken down over the shoulder and side of the ewe.

Lamb Can Drink Easily

This method eliminates one of the main causes of lambs not mothering up to ewes successfully, because it keeps the hindquarters of the ewe still so that the lamb can go in and drink. The common method of tying a ewe by the head or foot allows it to move around over quite a large area and the lamb is unable to get a drink. Even when ewes and lambs are penned the freedom of movement allowed the ewe will often prevent mothering up.

Using the method outlined here, mothering up is quick and generally after half a day the ewe has taken the lamb well enough to be allowed a little more freedom by release of the rope and tying her by the foot; she can be released completely the next day. If the skin of the ewe's dead lamb is available, it is put on the foster lamb and taken off when mothering has been completed.

Ewe Cannot Struggle

This method eliminates the violent struggling of the ewe which is the main cause of failures in mothering up foster lambs. The ewe settles down quickly and the lamb can go in for a drink without being bunted, kicked, or knocked out of the way.

High death rates of lambs during and just after lambing severely affect lambing percentages. Some losses are inevitable, especially in difficult country, but good shepherding such as is described here can prevent many of them.

Mixed Borders in the Flower Garden

NOT many New Zealand gardens have what might be strictly referred to as the shrubbery, the rockery, the herbaceous border, or the water garden. Few New Zealanders discipline themselves to one group of plants; but they prefer to choose widely from the range of plants that will adapt themselves easily.

SMALLNESS of most town sections greatly restricts the number of species that can be grown, especially when plants are grouped in twos or threes to give depth. In both town and country gardens the scarcity of labour to maintain intensive plantings has resulted in the development of the mixed border. In it there is no limit to what can or must be grouped, except in personal taste or that the plants themselves are not satisfactory and would thrive better in a different environment.

The mixed border is not new. The focal point of English cottage gardens was generally an area of shrubs, bulbs, climbers, perennial plants, and annuals; in fact, our mixed borders.

PREPARATION FOR PLANTING

Weed Control

In mixed plantings the plants will mostly be perennial and it is thus essential that perennial weeds are eradicated before planting begins. Digging to eradicate such weeds as twitch, sorrel, blackberry, and convolvulus will generally be very beneficial to the soil. Digging is usually much quicker and, if well done, a surer method than using chemicals. However, in large areas which will not be planted for several months chemicals could be used to kill the worst weeds and be followed by forking to remove the rest.

Chemical Control

Dalapon at 1 oz in 1 quart of water per 25 sq. yd. could be used against grass weeds such as twitch between autumn and early spring when several fine days are imminent. Three weeks after spraying the area should be forked or rotary hoed and planting can begin two weeks later.

Using hormones such as 2,4-D or MCPA against convolvulus, tradescantia (wandering willie), allium (wild onion), and similar plants it may take several months to gain control, as a single treatment will not be effective and spraying must be repeated. With these persistent weeds regrowths have to mature before they can be effectively sprayed. Spraying may have to be repeated to clean the area. Where vapam at 1 quart to 10 sq. yd. in water is used during summer to control oxalis, the surface should be kept moist for 48 hours; one week after application the area can be worked and a week later planting can begin.

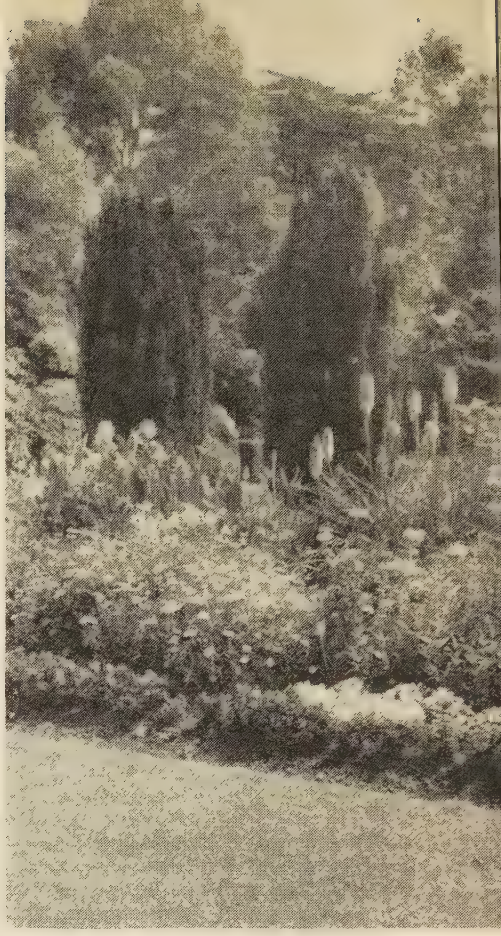
Cultivation

In deep, loamy soils deep cultivation is not essential, but on soils of heavy clay and for those with impervious subsoils the more thorough the cultivation to a good depth the better will be the root development and plant growth.

Where shrubs are being planted in the border it is unwise to dig a deep hole for a shrub and have only shallow cultivation in the remaining area. Such a hole may act as a drainage sump for the area and thus damage the shrub roots; shrub roots are generally larger and stronger than those of herbaceous perennials, annuals, and bulbs and thus better able to penetrate the soil themselves.

By ROSALIE A. CAMPION,
Horticultural Instructor,
Department of Agriculture,
Wellington

Double digging of all border areas is highly desirable. This entails digging off the first spit (spade depth) of soil and deeply working the second spit of soil with the fork. Compost or animal manure could profitably be mixed into this second spit when it has been well broken up. This opportunity should not be missed as in mixed plantings it is rarely possible after the initial preparation to dig and manure to this depth. Further available organic matter may be worked into the top spit and as much as 15 lb of dry weight per square yard may be added. In subsequent years mulches of composted material or decomposing sawdust will add to the organic content of the top spit of soil.



▲ A corner of a garden pleasingly filled with a mixture of plants. The large trees in the background, the yew trees in the centre, the taller perennials, and mixed annuals are offset by an annual edging.

Considerations

Though mixed borders which can be viewed from both sides are very effective in large gardens, private gardens in New Zealand usually lend themselves to plantings backing on to a boundary or front fence.

Evergreen hedges draw heavily on the moisture and nutriment of the soil and planting should not be within 2 ft of them. Alternatively, a barrier could be placed between the hedge roots and the border. A narrow trench two spits deep could be dug to restrict the roots. This could be left open or sheets of old iron could be inserted, their top being level with the ground. The trench could then be filled in.

A wooden fence can be an attractive background, especially if creosoted. Rustic or trellis fences look well when draped lightly with climbers, especially evergreen types. When concrete posts are used these fences require very little maintenance.

Existing Tree Roots

In old gardens or subdivisions of old estates it is often necessary to develop a mixed border on an area containing many tree roots. Beeches, elms, maple, fast growing natives, and other surface rooting trees are worst; the deep-rooting oaks give less concern. Even if the roots are dug from the area and the soil enriched for planting, the tree roots will quickly infiltrate the area again. An impenetrable barrier such as tin sunk 18 in. on the garden edge will help, but the roots will generally like to return to the nourishment. Feeding of the border will need to be regular and frequent to provide nutrients for both the trees and the border plants.

MIXED BORDERS IN FLOWER GARDEN

Standard roses interplanted → with dahlias, carnations, gerberas, heuchera, and gladiolus make a satisfactory planting for an area close to the house.

Bulbs

Strong-growing bulbs in the border need to have their positions marked and those which need full sun to cure the bulbs after flowering must not be overcrowded. Smaller bulbs can easily be overlooked and lost, but rings of stiff plastic made from offcuts as illustrated, or used tins with top and bottom removed, can be inserted in the soil as markers.

Mixing Plants

Growth habits of plants should be known before they are mixed, as it will ensure that plants are not put in positions unfavourable to them. Different species of the same genus of shrubs may be upright, horizontal, a large bush, or a low round bush. The range of *Grevillea*, for example, includes:

G. alpina (small, low bush, 3 ft), *G. asplenifolia* (large, round bush, 8 ft), *G. fasciculata* (dwarf, semi-trailing), and *G. lavendulacea* (prostrate). It is important to choose the correct one for the position.

Dahlias and annuals are used in → a small pocket to give summer colour to a background of evergreen shrubs whose beauty will remain in winter.

In informal plantings of herbaceous perennials colours should blend, but contrasts in growth habit will add interest. It is often necessary to shift plants to achieve this or good cultural growth. Plants which are not thriving after two years in a position should

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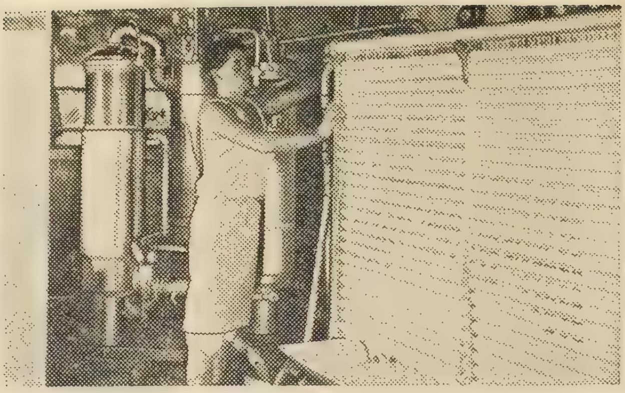

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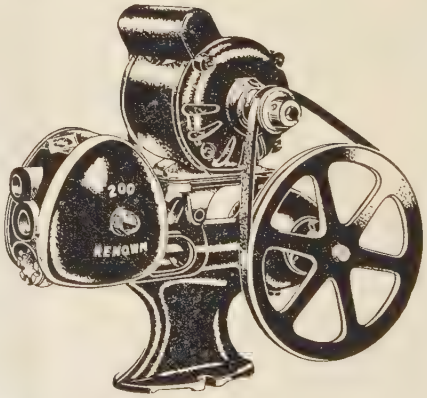

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MAINTENANCE

Watering

In plantings which include trees, shrubs, and other plants with large leaves, moisture requirements should be closely attended to. Moisture is given off through the leaf surface of plants and by the time leaves wilt the roots may have been damaged. Mulching with compost between the plantings when the soil is quite moist will help retain moisture.

Staking

Herbaceous plants in windy areas especially need staking. Shrubs sometimes break the full gust of the wind, but eddying gusts can cause great damage. In fertile soils, closer planting will help plants to support each other.

Maintaining Fertility

If fertility is not maintained, the display will soon deteriorate. The use of compost at least every third year not only has fertilising value but also helps the soil to retain other fertilisers and moisture and increases the bacterial population. Mulching in this way of such plants as heucheras, shasta daisies, and primulas which have a tendency to grow out of the soil will keep their roots and basal parts covered. Bulbs which grow naturally with the top exposed should not be mulched. Each spring the following fertilisers could be used per square yard:

Shrubs and Bulbs

3 oz of bonemeal or bonedust
1 oz of sulphate of potash

Annuals and Herbaceous Perennials

4 oz of blood and bone
1 oz of sulphate of potash

The Use of Lime

Most perennial plants and shrubs prefer slightly acid soil and as lime increases soil alkalinity it should be used very sparingly. In the making of compost which might be used in the border, very little lime should be applied. If compost is well aerated in the making no lime is necessary. Plants such as dianthus, geraniums, pyrethrums, delphiniums, achillea, aucuba, brooms, cistus, hypericum, and senecios which appreciate lime can be given a light annual dusting of 1 oz per sq. yd. of lime during winter.

Dividing and Cutting back

Shrubs should generally be pruned back immediately after the main flowering. Hedges could be pruned at least in about November and late February to keep them attractive. Perennial plants should be divided after one or two years as the growth demands or with paeonies, hellebores, agapanthus, and spireas, left for several years until growth deteriorates.

In late autumn borders should be tidied by cutting back the flowering stems and lightly forking the surface.

Pests and Diseases

No pests and diseases are specific to a mixed type of planting and normal methods of prevention and control should be used.

PLANTS FOR DIFFERENT CONDITIONS

Plant groupings will differ in every garden, but in home gardens moisture, sun, and wind, together with combinations of these, will be found. A gardener may be interested in bulbs, perennials, or succulents, and another may concentrate on shrubs. Groupings will be governed by the size of the garden, plant preferences of the owner, soil conditions, aspect, and often plants received as gifts.

MIXED BORDERS IN FLOWER GARDEN

Offcuts of stiff plastic after being softened in warm water have been shaped to mark and protect small plantings of bulbs in a mixed grouping.

Hot, Dry Conditions

Succulents

The first grouping which suggests itself for a hot, dry position, often found under the eaves of houses, and which could sometimes be developed with rocks is a mixture of succulents, including cacti. Areas of sandy soil or of rotten hillside rock are equally suited to these types of plants.

Bolder types such as aeonium, agave, aloe, euphorbia, opuntia, puya, or yucca could be used toward the back of the area. Yuccas will thrive where tree roots rob the soil. Gaps between the larger plants can be filled with plants such as the rosette-forming echeverias, haworthias, and sedums. These again can be interspersed with plants such as *Rochea coccinea*, which gives a long display in summer of brilliant red flowers, with lithops (the stone plants), and other members of the large mesembryanthemum family. Species of the following families will also mix well together: *Cotyledon*, *Crassula*, and *Drosanthemum*.

Shrubs and Perennials

A border can comprise shrubs and perennials found growing naturally under hot, dry conditions as in Australia and South Africa. These perennials like a moister winter than the succulents.

Plants suitable for inclusion are *Beschornaria yuccoides*, which has a large and attractive flower stalk up to 10 ft high, *Hakea laurina*, banksias, melaleucas, proteas, leucadendrons, leucospermums, and callistemons.

Smaller plants which combine satisfactorily are cistus, calocephalus, leonotis, agapanthus, serruria, euryops, and phoenocoma. Suitable annuals and perennials for filling in gaps and for the front of the border include arctotis, gazanias, pelargoniums, geraniums, dimorphotheca, gerberas, and ursinia.

Combinations for Damp Areas

Very few plants will thrive in bogs, but there are plant associations which will thrive in damp conditions provided that the drainage is sufficient.

Tall and dwarf hydrangeas can be combined with fuchsias of varying heights. These can be planted at the base of flowering plums, silver birches, or ash trees where room allows. Native flaxes can be used to advantage in combination with round foliaged plants such as myosotidium (Chatham Island forget-me-not), *Anemone japonica* (Lenten lily), hosta (funkiá), *Primula japonica*, *P. bessiana*, or *P. pulverulenta*.

An attractive combination can be made using individual plants of

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A mixed perennial planting against a background of shrubs.

A mixed planting of annuals brightens a corner among old established shrubs.

camellias or rhododendrons interplanted with liliums of two distinct flowering periods; for example, *L. regale* and *L. auratum* hybrids in groupings of various sized deciduous azaleas. Over the whole area the forget-me-not *Cynoglossum amabile* can be allowed to self seed.

Shrubs of clethra, corylopsis, kalmia or hebes (veronicas) can be attractively interplanted with dwarf hebes, *Iris unguicularis* or *I. kaempferi* or convallaria (lily-of-the-valley), while a restful mixed planting can be made using the various species of ferns, including tree ferns.

Dry, Shaded Positions

Dry, shaded areas, usually poor, are often found under large trees, on the south side of hedges, or along the sides of houses where a hedge or fence shields off the rain-bearing southerly winds. Suitable lower-growing shrubs for grouping in such positions include *Aucuba japonica* (male and female), *Brachyglotis repanda* (Rangiora), and *Mahonia bealei*. Other plants are heuchera, oenothera (evening primrose), pachysandra, ajuga, bergenia, inula, and iresine. Trailing plants such as vinca (periwinkle), hypericum, and hedera (ivy) are useful additions.

Full Sun and Average Soil

Full sun and average soil suit an unending range of plant combinations, especially of shrubs and perennials. A planting of kniphofia (red hot poker) in various sizes, colours, and flowering times interplanted with *Rudbeckia newmani* or gaillardia 'Hugh's Red' and bordered with agathea or blue penstemons could be planted in a group with one or two cytisus (flowering brooms). By using an early flowering shrub among summer flowering perennials the length of flowering is extended.

For a mauvy-pink drift in a border, manukas could be interplanted with varying coloured delphiniums which are allowed to seed themselves, undersown with the colourful cosmos, grading down to a patch of pink, blue, and white perennial scabious, and edged with annual carnations and dianthus.

In predominantly herbaceous plantings a large number of early flowering types should not be planted in the front of the border unless they retain their foliage well. A mixture can be offset with an edging of permanently foliaged plants such as lavender, arabis, aubretia, or geranium 'Mme. Salleroi'.

CLIMBERS AND PERENNIALS

Situations where a mixture of climbers and perennials are valuable are where the background to the border is a wooden fence and climbing plants are used to drape it, and where a border is being developed on an area containing tree stumps which could be covered and thus used to raise the height of the border. Annual and perennial climbers can be trained up frameworks in a mixed border to gain height. Sweet peas and stocks combine well, and evergreen climbers, especially *Hedera helix* (common ivy), offset other mixed colours at all times of the year. The climbing fig clings well against brickwork and is easily managed.

BULBS IN MIXED BORDERS

The use of bulbs depends on the plants with which they are combined. Most liliums naturalise well with shrubs preferring acid soils and gladiolus mixes well with herbaceous perennials. In hot, dry borders large-leaved plants do not predominate and plants such as nerines, watsonias, zephyranthes, belladonna and chlidanthus can get sufficient direct sun to mature the bulbs. Planting of tulips to a depth of 10 in. in rose beds overplanted with pansies is a pleasing combination. Muscari (grape hyacinths) and scillas (wood hyacinths) among plantings of shrubs and *Erigeron* 'Elsie', whose summer growth helps to smother the remaining foliage is pleasing.

In intensive plantings bulb areas should be well marked or while dormant the bulbs may be damaged when cultivating.

ANNUALS IN MIXED BORDERS

While individual annual plants can be mixed with perennials it is more usual to have them in beds. Mixed bedding schemes can be most attractive. For spring flowering they are often combined with bulbs such as

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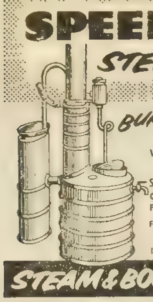

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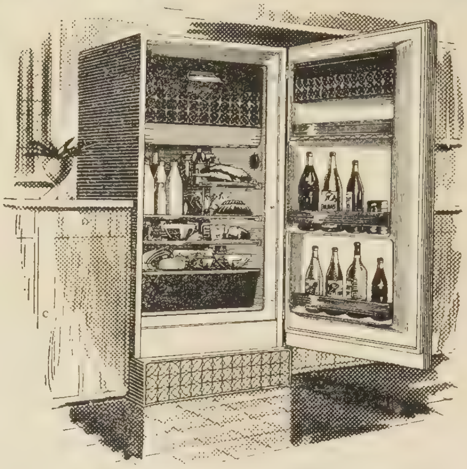

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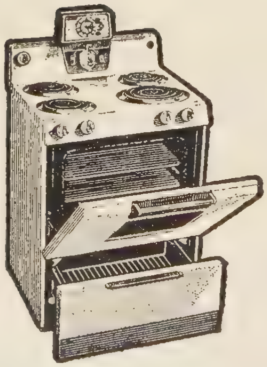

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tulips and narcissi and for summer flowering they are often used with shrubby plants such as *Abutilon thompsonii*, standard fuchsias or *Artemisia lactiflora*. A mixed planting of roses and light annuals such as pansies, carnations, ageratum, or verbena is attractive in informal situations.

Among shrubs and for any gaps in informal perennial plantings annuals are useful if sown where they are to flower. There are many to choose from and most will harmonise. Old favourites such as nigella (love-in-a-mist), viscaria, cornflowers, or linum can be relied on, but others such as charies (blue daisy) and *Euphorbia marginata* (snow - on - the - mountain) should be tried.

Annuals which are allowed to self seed can give a perpetual supply of seedlings and flowers with little trouble.

UNDER PLANTING FRUIT TREES

In town gardens where space is limited planting under fruit trees can allow a few extra species to be fitted in. It is unlikely that sprays applied to fruit trees will damage the flowers and they may even be beneficial. A planting of spring bulbs to flower when the trees are in bloom, followed by long flowering perennials such as arctotis, coreopsis, *Salvia uliginosa*, alstromeria hybrids, and anthemis are worth while. Hardy types should be selected so that they do not get damaged during pruning, spraying, or picking.

Garden Work in June

Planting

Continue planting deciduous trees, shrubs, and hedge plants if the soil is not too wet. If the soil is sticky, heel in the plants and delay planting until the soil has dried sufficiently, even if this means waiting until next spring. Planting in too wet soil checks the plants' growth seriously and may result in death of those needing a well aerated soil.

By JOY WATKINS,
Horticultural Advisory Officer,
Department of Agriculture,
Auckland

In clay soils improve drainage for individual trees and shrubs by digging a large hole at the lowest corner of any planting position, filling it with graded scoria or similar material and laying a drain to carry water away from it; otherwise holes made for plants on compacted clay soils will act as sumps and the roots in them will be drowned in very wet weather.

Avoid planting in a position from which a tree has been removed or has died, as the soil there is likely to be exhausted or infected with disease. Copper oxychloride at 1 lb to 5 sq. yd. forked or watered into the soil before replanting is a precaution against soil-borne diseases.

Small plants move more readily than large, with a few exceptions; for example, rhododendrons, azalea, and michelia, which form a mat of fibrous roots and can safely be moved when quite large. Only very small specimens of Australian and South African shrubs can be moved safely, as they have few roots and these are long and easily broken. Pot grown plants are best.

Cut back branches of most shrubs and trees to compensate for the loss of some roots when transplanting, unless they have been pot grown.

Cut hedge plants to about half their height. This encourages branching from the base. Hedges which are allowed to grow 4 ft high before they are trimmed become bare at the base, with the exception of cupressus and similar hedge plants.

In districts with comparatively mild winters evergreens can be planted at any time during winter when the soil is suitable.

Pruning

Continue pruning deciduous trees and shrubs.

Head back trees which have grown too tall, cutting each main stem back to a lateral (side branch). Cutting in this way ensures that when the sap rises in spring the vigour will go into that lateral and not into more unwanted upright stems.

Some overgrown hedges and shrubs can be cut back severely, as they will break and produce many new shoots from the old bare wood; for example, buddleia, corokia, escallonia, privet, acmena, and hydrangea.

Overgrown coniferous shelter belts and hedges, particularly cupressus, are likely to die if they are cut back hard, as they do not break from old wood. Remove and replant, as single dead trees can ruin the effect of a shelter belt. It may be possible to plant a new hedge within the shelter of the old, removing the latter when the new hedge is well established.

Routine Work

Fork lightly between shrubs and herbaceous plants. Complete the cutting back of herbaceous plants. Stir the soil between bulbs and bedding plants when the soil is sufficiently dry.

Remove fallen leaves from the rock garden, stir the soil, and topdress with fresh soil and scoria or stone chips. Protect woolly leaved plants with a sheet of glass, as these are most likely to rot from excessive moisture during winter. Set slug baits, protected from rain, near choice plants.

Bulb beds which are free of weeds, also beds of callas, delphiniums, and some other plants can be kept free of annual weeds by spraying now with diuron at **1 oz to 150 sq. yd.** Be particularly careful not to exceed this rate of application and as far as possible do not wet the plant leaves with the diuron solution.

Sprayed ground must not be hoed; otherwise the chemical seal is broken and fresh weed seeds are brought to the surface.

During wet weather clean the tool shed, clean and sharpen tools, and make equipment ready for next season. Paint wooden labels. Metal labels are cheap and easy to use. Small metal labels are more easily found and read in the garden if they are attached to bamboo canes or similar sticks.

Check dahlias and gladioli in store and to prevent the spread of infection remove any which have rotted. A cool, dry, frost-free atmosphere is essential for good storage. Dusting the corms and tubers with thiram also checks rotting.

Stored seeds are best kept in an airtight tin, as respiration is reduced, so prolonging the effective life of the seed. Seeds which are left in their packets in a damp shed with a variable temperature are unlikely to germinate well next spring.

Remove moss from paths by spraying with bluestone, 1 teaspoonful in 1 gallon of water, or thiram at 1¼ oz of 50 per cent wettable powder in 4 gallons (1 level dessertspoonful in 1 gallon of water).

"Moss" (lichen) on fruit trees and shrubs is unsightly and may harbour insects. Spray dormant leafless trees with 1 part of lime sulphur in 10 parts of water. This solution must not be applied to evergreens or to deciduous trees when they are in leaf, as it will defoliate them, but it can be applied to the main trunk of such a tree if none is allowed to fall on the leaves. Normal fungicidal sprays throughout the year will check moss, which usually dries up and flakes off during hot, dry spells in summer.

Daphne bushes which have yellowish leaves often improve if given a mulch of tea leaves. It is possibly the regular watering from the teapot that is beneficial.

Dig vacant ground, mixing compost into the top layer of soil. Non-seeding weeds, grass mowings, untreated sawdust, and animal manure can be placed

[*Sparrow*

Glasshouse plants can be more easily maintained and a greater variety grown if the house is heated. For this purpose kerosene heaters of the type shown are cheap and effective.

in the bottom of the trench when digging, though it is better to compost these materials first. On clay soils do not go on the ground when it is very wet, as this destroys the structure, so that it is very sticky when wet, and yet dries into hard clods. It may take years of careful working and the addition of large quantities of organic matter and lime to restore a clay soil to a crumbly structure. Lime must not be used if rhododendrons and similar plants are to be grown. The improvement of soil structure is particularly important when clay soils are on steeply sloping sections. Rainfall then drains to lower layers and is evenly distributed throughout the soil so that there is less likelihood of soil slips.

Glasshouse and House Plants

Water glasshouse and house plants carefully with tepid water. African violets produce white blotches and circles on the leaf if watered with cold water. Similar symptoms appear if they are exposed to very intense lighting in summer.

House plants frequently become pale and drawn through lack of light during winter.

Coleus loses its leaves as the atmosphere becomes cooler. Place outstanding varieties in a glasshouse or warm well lit position until spring, when they are cut back to produce cuttings for next season's crop of plants. Discard poorer types and raise new ones from seeds or cuttings in spring.

Ripe seeds of citrus sown any time during winter will make attractive pot plants. The dwarf kinds are particularly suitable, for example, Otaheite orange. Do not allow citrus seeds to dry out, but plant as soon as they are removed from the fruit. Other dwarf trees which make attractive pot plants are dwarf pomegranate, and the dwarf kumquat, which is seldom without flowers and fruit.

In the glasshouse moss may form on the surface of soil in boxes and pots. Use a pointed stick or knife to remove the sour surface soil and moss from pots and then add fresh soil mixture. Use the same method between large plants in boxes, but if the box is filled with small seedlings, spray them with thiram at $\frac{1}{4}$ oz of 80 per cent wettable powder in 5 pints of water. This amount is sufficient for 25 boxes. It does not harm the seedlings.

Frames or a light glasshouse made of rough timber covered with plastic are valuable for protecting plants through winter. An article on plastics for glasshouses and frames appeared in the May 1960 issue of the "Journal".

Plants in glasshouses are easier to look after and can be grown in greater variety if the house is heated sufficiently to exclude frost and to maintain a dry, buoyant atmosphere during winter. High humidity and low temperatures are the causes of damage from botrytis and other fungous diseases.

Kerosene heaters are cheap and effective, and on most days they can be turned off during the morning and early afternoon. In larger glasshouses two or three kerosene heaters may be needed to provide sufficient heat on very cold nights. It is easier to regulate the temperature when more than one heater is used, as they can be spaced out in the house, giving better circulation of air; and one or more may be used as necessary.

Kerosene heaters need to be refilled and the wicks cleaned regularly, so when less attention can be given to the glasshouse it may be more convenient to install an electric heating system which is thermostatically controlled to maintain a pre-determined temperature.

Electric cables supported round the walls under any staging are usually most suitable in small glasshouses and are relatively inexpensive to install and to run. This work must, of course, be done by a qualified electrician. Alternatively, electric space heaters, which warm the air and circulate it with a fan, are efficient and can be plugged in direct to the household circuit.

Floral Decoration

Cut winter flowering shrubs carefully so that the shape of the bush is not destroyed. Where possible, cut to a lateral which will continue the growth of the branch. Always select branches which should be removed; that is, those which are weak, crossing, or crowded.

After cutting, remove bottom leaves and place the stems in cold water for at least 12 hours before arranging. Slitting the base of the stem upward for an inch or two facilitates entry of water. This part is cut off before arranging.

Twist cyclamen flowers carefully from the corm, recut the stem, and place immediately in deep, cold water. If trouble is experienced with cyclamen wilting, try slitting the base of the stem upward for about an inch or placing the bottom inch only in hot water for a short time before placing up to the neck in cold water overnight. This flower should last at least two weeks.

Pick *Iris unguicularis* (*I. stylosa*) in the bud to avoid damaging the delicate petals. It will quickly open in the house and is attractive to watch as it unfurls.

[Green and Hahn

Distinctive and Satisfying . . .

Suggestions for Lunch or Tea

DECIDING on a tea or lunch dish is frequently the biggest problem in planning a day's menu. During summer, salads are easy and endless in their variety, but keener appetites during winter demand something more substantial.

HEADING PHOTOGRAPH: A bread roll, fresh fruit, and coffee complement any of the appetising suggestions in this article.

By JUDITH FERRIER,
Home Science Instructor,
Department of Agriculture,
Christchurch

LACK of time and inspiration is often blamed when this "something" becomes a too familiar repetition of the old stand-bys, yet a few minutes spent planning for the week ahead would bring greater variety with less wasted time, thought, and energy.

Ideas gleaned from books, the radio, and magazines can be noted to be tried before they are forgotten or mislaid. A tidier recipe drawer should emerge, as only family-approved recipes need be kept.

Thinking ahead in this way also has these advantages: Necessary ingredients can be included with the regular grocery order, some preparations can be done beforehand in spare moments, leftovers can be planned for, and the best use made of the oven and elements.

All the following recipes are based on the use of an 8 oz cup and a set of American standard measuring spoons.

SUGGESTIONS FOR LUNCH OR TEA . . .

Spanish Rice

2 oz of butter or bacon fat
2 medium onions
6 sticks of celery
2 cups of peeled tomatoes
2 cups of rice
4 oz of tasty cheese, grated
3 rashers of streaky bacon (optional)
Salt and pepper

(6 servings)

Using a sieve, wash the rice in cold water. Cook in plenty of boiling salted water until almost done. Drain into the sieve and rinse well with running water. Spread on to a large plate or meat dish and leave to steam dry low in the oven at 300 degrees F or in the warming oven. Stir occasionally. Each grain should be firm but separate so that the rice has a fluffy appearance and is not heavy and starchy. This completes the cooking.

Peel the onions and dice them and the celery. Cook in the fat until limp. Put in the tomatoes and season well. Cook slowly for 15 minutes.

About 5 minutes before serving add the hot fluffy rice and stir slowly over a low heat. Turn out on to a heated serving plate and pile the cheese in the centre.

The bacon may be cut up and cooked with the vegetables or cooked separately and placed on top with the cheese.

Baked Eggs in Saucers

6 eggs
½ cup of milk or thin cream
2 oz of tasty cheese, grated
Salt and pepper

(6 servings)

Butter six old saucers generously. Break an egg carefully on to each. Top with a little milk and grated cheese and season.

Bake about 15 minutes at 325 degrees F in the middle of the oven or until the eggs are set and the cheese has melted and browned.

This basic recipe can be varied by breaking the eggs on to such additions as finely chopped onion, tomato, asparagus tips, mushrooms, celery (precooked in butter), thin slices of grilled kidney, cold cooked sausage, fried bread croutons, or bacon bits.

Easy Egg Pilau

2 cups of minced raw meat
2 cups of cooked rice
2 cups of vegetables, for example, peas, beans, shredded carrot, or chopped tomato
1 onion, chopped
½ cup of chopped toasted nuts (optional)
6 to 8 eggs (one for each serving)
½ teaspoon of butter per egg
1 oz of fat
Salt and pepper
½ teaspoon of mixed herbs
2 tablespoons of tomato sauce or ketchup

(6 to 8 servings)

It is preferable for the rice to have been cooked in meat stock or water in which bouillon cubes or meat extract have been dissolved.

Brown the onion in the fat. Season, and mix in all the other ingredients except the eggs and butter. Transfer to a greased, open casserole and bake for about 50 minutes in a moderate oven.

Remove from the oven and make a depression in the rice for each egg. Break an egg into each hollow, season, and top each egg with ½ teaspoon of butter.

Return to the oven for 8 to 10 minutes or until the eggs are set. Serve with a bowl of grated cheese.

Vegetable Meat Ball Soup

5 pints of meat stock
1 cup of barley or lentils
½ cup of diced carrot, diced swede, sliced leek, and finely sliced celery, as available
1 medium onion, finely chopped
1 cup of whole kernel corn
1 cup of tomato puree
Or
2 cups of preserved tomatoes
4 teaspoons of salt
½ teaspoon of pepper
2 bay leaves
¼ teaspoon of basil
1 lb of minced meat (for example, mixed beef, veal, and pork)
Or
½ lb each of sausage meat and minced meat
¾ cup of fresh breadcrumbs
¾ teaspoon of salt
¼ teaspoon of pepper
¼ teaspoon of grated lemon rind if available
½ cup of chutney, pickle, or relish
1 egg, beaten

(6 to 8 servings)

Cook the barley or lentils with the bones when preparing the meat stock. Season the stock with the salt, pepper, and basil. Mix in the prepared vegetables and bay leaves and simmer gently until well cooked. Take out the bay leaves.

Mix thoroughly the meat, breadcrumbs, seasonings, and chutney and bind with the beaten egg.

Form tablespoonfuls of the mixture into balls and roll in seasoned dry breadcrumbs or crushed cornflakes and fry in bacon fat until they are cooked inside and brown on the outside (10 to 15 minutes). Drain on absorbent paper and add to the soup just before serving.

Alternatively, the meat balls may be left uncrumbed and simmered in the soup for 30 minutes before serving.

This soup makes a very substantial meal.

French Onion Soup

6 medium onions
5 tablespoons of butter (2½ oz)
5 tablespoons of flour (1¼ oz)
Grated cheese
2 pints of stock
1 cup of cream or creamy milk
Salt and black pepper
4 slices of bread cut ½ in. thick

(4 to 6 servings)

Peel the onions, slice very thinly into a heavy-base saucepan, and season with salt. Add the butter and braise slowly with the lid on until the onions are very well cooked. Mix in a little of the cream if necessary.

Stir in the flour and cook for 2 minutes. Blend in the stock and heat to boiling point.

Trim the crusts from the bread, cut it into quarters or 2 in. rounds, and toast one side. Toast the other side lightly, then cover thickly with finely grated cheese. Season with black pepper and place under the grill until the cheese has melted. Put the cheese toasts in the bottom of heated soup bowls. Just before serving stir the cream into the hot soup, then pour over the toast. Additional grated cheese may be sprinkled on the soup.

Potato Salad

3 cups of diced, cooked potato
1½ tablespoons of chopped chives
3 hard cooked eggs, diced
2 rashers of cooked bacon, diced
¼ cup of minced parsley
¼ cup of water
¼ cup of vinegar
2 oz of butter
½ teaspoon of salt
¼ teaspoon of pepper

(4 to 6 servings)

Choose waxy potatoes and boil them with the skins on. When cooked, cool them, peel, and cut into ¾ in. cubes.

Keep the yolk of 1 egg. Dice the others and mix them lightly with the potatoes, chives, parsley, and half the bacon.

Heat together the water, salt, pepper, and butter until the butter is melted and combine with the vinegar. Pour over the potato mixture and mix thoroughly.

Chill or leave to stand for several hours so that the flavours blend, mixing occasionally so that most of the liquid is absorbed.

Serve in a plain china or wooden bowl with the rest of the bacon, a few additional sprigs of parsley, and the egg yolk grated and sprinkled over the top.

Serve cold with cold roast meat. Served hot it makes a good accompaniment for roast pork or baked fish as a main course.

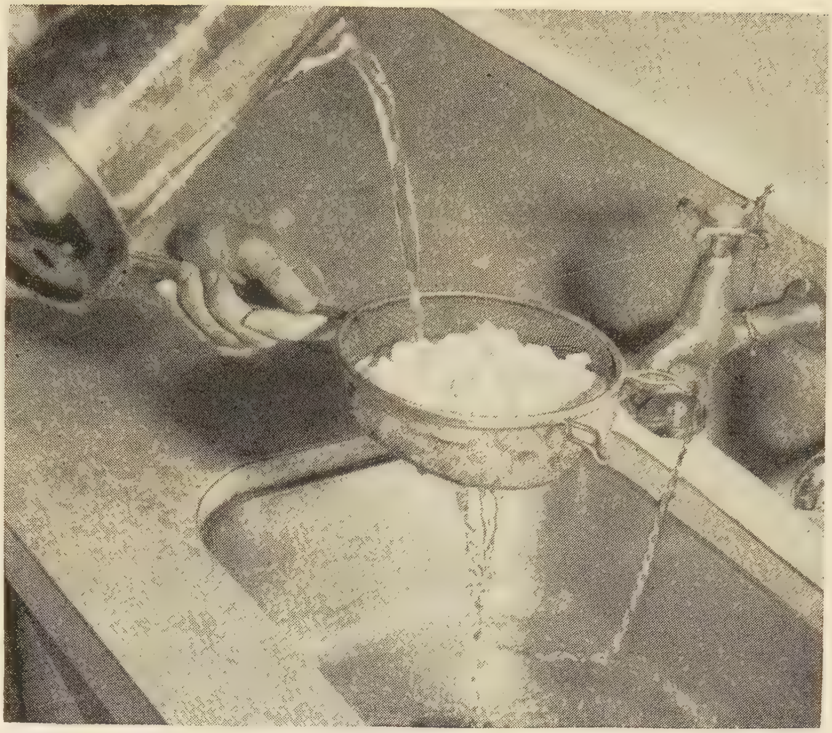
Chinese Omelet

⅔ cup of uncooked rice
4 eggs, separated
5 oz of tasty cheese, grated
2 teaspoons of made mustard
½ teaspoon of paprika (optional)
2 teaspoons of salt
1¼ cups of medium white sauce made from:
1¼ cups of milk
2½ tablespoons of flour
2½ tablespoons of butter
½ teaspoon of salt

(6 servings)

Cook the rice in plenty of boiling, salted water. Drain and steam dry.

While the rice is drying make the white sauce. Melt the butter and stir



[Green and Hahn

When preparing the cooked macaroni in the puffed macaroni cheese recipe turn it into a sieve or colander and rinse with a kettle of boiling water to remove excess starch. Shake off the surplus water, return the macaroni to the rinsed saucepan, and add 1 tablespoon of butter. Toss over a low heat for 1 to 2 minutes and it is ready for use.

in the flour and salt. Pour in the milk one-third at a time. Stirring continuously, bring to the boil and cook for 2 to 3 minutes without stirring. Made in this way the sauce should be lump free. Cool, and stir in the grated cheese, mustard, paprika, and salt.

Combine the sauce and the hot drained rice.

Beat the egg yolks until light and blend through the rice mixture. Beat the egg whites stiffly, and carefully fold into the rice mixture.

Turn into a greased casserole and bake at 325 degrees F for 20 to 30 minutes or until set. Serve with a savoury sauce.

Stuffed Hearts

6 sheep hearts
Or
3 calf hearts
3 tablespoons of butter, melted
3 tablespoons of finely chopped onion
¾ teaspoon of salt
¼ teaspoon of pepper
¼ teaspoon of dried thyme or 3 sprigs of fresh thyme
2 cups of small cubes of bread
3 tablespoons of chutney
3 tablespoons of tomato sauce
1½ cups of orange juice or water or a mixture of both
3 tablespoons of lemon juice or vinegar
3 medium cooking apples
8 prunes, stoned

(6 servings)

Remove the membranes, arteries, and veins and wash the hearts thoroughly under cold, running water.

Fry the onion in the butter until golden. Stir in the bread cubes, seasoning, chutney, sauce, and herbs and heat through.

Stuff the hearts, but do not fill them too tightly as the stuffing will swell slightly during cooking. Sew up the openings with coarse thread and place the hearts in a deep casserole.

Peel, core, and quarter the apples and put them in the casserole with the prunes and liquid. Cover with a lid or buttered paper and bake at 350 degrees F for 2 hours.

It may be necessary to add a little more liquid later as the hearts are inclined to be dry and need adequate moisture during cooking.

Serve with plain boiled rice cooked according to the directions given in the recipe for Spanish rice.

Paprika Potatoes

8 medium potatoes
1 large onion
3 tomatoes
Water
2 oz of butter
4 teaspoons of paprika pepper
1 teaspoon of carraway seed (optional)
Salt

(4 to 6 servings)

Peel and chop the onion and fry in butter until golden. Blend in the paprika smoothly. Skin and chop the tomatoes and combine with the fried onion.

Peel and slice the potatoes thickly and add to the mixture with the salt and carraway and just enough water to cover (¼ to ½ pint).

Cook until the liquid has almost evaporated or bake in a casserole in the oven.

For variety, top each serving with a fried egg.

Paprika pepper is not hot, but has a pleasant mild flavour and a bright red colour.

Puffed Macaroni Cheese

6 oz of macaroni
1½ cups of milk, scalded
1 cup of fresh breadcrumbs
½ lb of tasty cheese, grated
½ teaspoon of salt
¼ teaspoon of cream of tartar
Or
½ teaspoon of vinegar
3 eggs, separated
¼ cup of diced carrot, celery, or green pepper, or any cooked vegetable
1½ oz of butter, melted
1 medium onion, chopped
1 tablespoon of chopped parsley
Tomato slices or parsley for a garnish

(6 servings)

Cook the macaroni in about 2 quarts of salted water. Stir it into rapidly boiling water. Return to boiling point as quickly as possible, then turn down the heat to low and simmer for 15 to 20 minutes. It should not be rubbery when cooked. Turn into a colander and pour over it about 1 quart of boiling water to remove excess starch, then drain well.

While the macaroni is cooking pour the hot scalded milk over the bread crumbs. Put aside half a cup of the grated cheese and mix in the rest with the milk mixture. Cover and let it stand until the cheese has melted.

Cook the vegetables in the butter and mix the contents of the pan with the milk mixture.

Beat the egg yolks and blend them into the mixture with the seasoning, parsley, and macaroni. Beat the egg whites and cream of tartar (or vinegar) until stiff but not dry, and fold them carefully through the mixture.

Pour into an ungreased 10 in. round casserole or an oven dish 10 in. x 6 in. x 1½ in. Bake, uncovered, at 325 degrees F for 50 minutes or until set.

Top with the other half cup of grated cheese. Sprinkle liberally with pepper and return to a hot oven for a few minutes to melt the cheese. Garnish with parsley or tomato slices.

Slim Anna says;

"Summer's for the slim,
the figure-proud.
Will you be basking in
admiration as well as
sunshine?
NOW is when you do
something about it."

ORANGES are your *natural* ally. Eat them whole between meals to restrict your appetite for high-calorie, fat-forming foods. That way they're rich with protective and tonic virtues too. The juice gives you vital Vitamin C. The succulent "flesh" provides proto-pectins to improve digestion, inositol to protect the liver from harmful fatty deposits, bio-flavonoids to keep the tiny blood vessels elastic and youthful and Pro-vitamin A for eye and skin health.

Spanish Pancake

4 medium onions
2 large cooking apples
1 banana, sliced (optional)
1 lemon
½ cup of sultanas, washed
4 eggs, separated
½ cup of milk
3 oz of butter
Salt and pepper

(4 servings)

Peel, core, and chop the apples and onions finely. Season, and combine with the juice of the lemon, 1 teaspoon of grated lemon rind, and the sultanas.

Melt 2 oz of the butter in a saucepan with a tight-fitting lid and braise the apple-onion mixture slowly until very soft before stirring in the banana slices.

Melt the rest of the butter in a heavy-base frying pan. Beat the egg yolks with the milk and beat the whites stiff. Combine them carefully, pour on to the cooked mixture and blend briefly (it does not have to be well mixed), then pour the mixture into the hot frying pan.

Cook gently until it is set and the underside is browned. Turn over, using a plate to help, or brown the other side under the grill.

Cut into thick wedges and serve with a sharp-flavoured sauce, such as this citron sauce.

Citron Sauce

½ cup of syrup from preserved fruit (not red in colour)
1 teaspoon of salad oil or melted butter
3 teaspoons of vinegar
2 tablespoons of marmalade jelly
¼ teaspoon of cummin seed
Or
1 teaspoon of grated lemon rind
Salt and pepper

(4 servings)

Mix together all except the marmalade and simmer gently for 5 minutes. Add the marmalade and cook for 2 more minutes.

Mock Pizza Pie

The traditional Italian pizza pie has a yeast dough base which is brushed with olive oil and topped with tomatoes, olives, anchovy fillets, and cheese arranged in a simple pattern. Oregano or dried majoram is used for flavour and the pie is served with a well flavoured sauce.

This recipe uses this idea, but has a scone dough base brushed with melted butter before cooking. If desired the dough could be baked in two round cakes and sandwiched together like a fruit shortcake.

Base

1 cup of wholemeal
1 cup of flour
1 tablespoon of cornflour
1 teaspoon of salt
2 oz of butter
4 teaspoons of baking powder
⅔ to ¾ cup of milk
Or
Half the liquid may be tomato soup

(4 servings)

Sift the dry ingredients together and cut in the butter. Mix together to form coarse crumbs. Make a well in the centre and stir in sufficient liquid to form a stiff dough.

Turn out on to a floured surface and knead **lightly** with the fingertips for about 15 seconds. Form into a round cake ¾ in. thick on a cold, ungreased oven tray. Brush with melted butter.

Spread the prepared topping to within ½ in. of the edge and bake 15 to 20 minutes at 425 degrees F. Lower the temperature to 400 degrees F and cook 10 minutes longer if necessary.

Suggested Toppings

1.
1 cup of cooked minced onion
1 cup of grated cheese
4 rashers of bacon, diced
2 tablespoons of chutney or pickle
Seasoning

2.
1 small tin of sardines or shrimps
½ cup of whole kernel corn, drained
½ cup of tomato slices
Juice of half a lemon
Seasoning

3.
1 cup of sliced celery or green pepper
½ cup of buttered breadcrumbs
½ cup of chopped ham or cooked meat
Seasoning

4.
2 hard cooked eggs, quartered
1 cup of sliced tomato
½ cup of sliced olives
Seasoning

Serve the pie cut in wedges with a hot savoury sauce which could be made by heating a tin of cream soup (undiluted).

Creamy Scrambled Eggs

6 eggs
¾ cup of milk
1 oz of butter
1 teaspoon of salt
⅛ teaspoon of pepper
Parsley sprigs if desired

(4 servings)

Melt the butter in a heavy frying pan or the top of a double boiler.

Beat the eggs with a fork enough to combine yolks and whites. Blend in the milk and seasoning. If desired sprigs of parsley may be added for extra flavour. Pour on to the melted butter and cook over a very low heat or hot but not boiling water until the eggs begin to set.

Lift and turn the egg mixture once so that the part which has not set comes in contact with the heat. It should be in large soft masses. Overcooking causes separation into rubbery egg and liquid.

Stuffed Marrow

1 medium marrow
1½ cups of minced raw meat
2 cups of soft breadcrumbs
1 onion, chopped finely
2 oz of mushrooms, chopped
2 teaspoons of mushroom ketchup (optional)
½ pint of cheese sauce (optional)
1 teaspoon of salt
½ teaspoon of pepper
¼ teaspoon of mixed herbs
1 tablespoon of chopped parsley
1 egg, beaten
2 tablespoons of butter
Tomato slices or mushroom caps (for garnish)

(6 servings)

Halve the marrow lengthwise and peel. Remove the pith and seeds and simmer for 8 minutes in salted water, then drain.

Brown the onion in a little fat. Stir in the seasonings, ketchup, parsley, minced meat, breadcrumbs, and chopped mushrooms and combine over a low heat. Remove from the heat and bind with the beaten egg. If it is very dry, moisten with a little stock or gravy.

Put one half of the marrow in a greased meat dish or casserole and fill the cavity with stuffing, mounding the top. Cover with the other half of the marrow, dot with butter, and bake in a moderate oven for 1¼ to 1½ hours.

Pour the cheese sauce over the marrow (optional), arrange the tomato slices or mushroom caps in line along the top, and brown at a high temperature. Buttered crumbs can be used as an alternative topping to the cheese sauce.

Liver Saute

2 tablespoons of butter
1 lb of liver
Seasoned flour
1 medium onion, chopped
¾ cup of green pepper slivers
1½ cups of whole kernel corn
4 cups of fresh tomato wedges or preserved tomatoes
1 teaspoon of dry mustard
½ teaspoon of pepper
½ teaspoon of paprika
Few drops of hot pepper sauce (Tabasco)
1 teaspoon of salt
1 teaspoon of Worcestershire sauce
½ lb of garlic sausage, frankfurters, or saveloys

(6 servings)

Skin the liver and remove the vessels. Cut into ¼ in. slices and coat with the seasoned flour. Melt the butter in a heavy pan and fry the liver for 2 to 3 minutes, no longer, then drain and remove from pan.

Slice the frankfurters diagonally ½ in. thick, and put them in the pan with the chopped onion and green peppers. Add more butter if necessary and saute for 5 minutes. Mix in the seasonings and 3 cups of tomatoes, cover, and simmer for 15 minutes. Add the liver, corn, and remainder of tomato. Continue cooking until heated through, about 5 minutes.

Serve at once over rice, buttered noodles, spaghetti, or thick slices of bread and butter.

Cauliflower Caroline

2 small cauliflowers or 1 large one
4 to 6 eggs
1 tin of sardines (3½ oz)
½ cup of chopped roast, salted nuts
Or
½ cup of buttered crumbs
1 lemon for garnish (optional)
Parsley sprigs
2½ cups of curry sauce made from:
4 tablespoons of flour (1 oz)
2 tablespoons of curry powder
6 tablespoons of butter (3 oz)
2 teaspoons of salt
2 teaspoons of lemon juice (optional)
2½ cups of milk

(6 servings)

Hard cook the eggs.

Break the cauliflower into serving-sized pieces. Steam or cook them in boiling salted water until almost cooked, but still firm.

Make the sauce by the method described in the Chinese omelet recipe. Blend in the curry powder with the flour and the lemon juice when it has thickened.

Shell the eggs and quarter them lengthwise. Drain the sardines and add to the sauce with the eggs. Drain the cauliflower and arrange it in a buttered casserole. Pour the sauce over and around it and sprinkle the top with the chopped nuts or buttered crumbs.

Cover, and heat through in a moderate oven. Garnish with lemon wedges and parsley or if a lemon is not available, save a few pieces of egg and sardine for a garnish.

Leeks En Brochette

4 young leeks
4 rashers of streaky bacon
1 oz of butter
Salt and pepper
Water

(4 servings)

Choose leeks of similar size. Cut off the green 1 in. above the white and trim the roots leaving the base intact. Make a lengthwise cut through the centre of each leek **almost** to the base and wash them carefully under cold running water.

Remove the rind from the bacon and wind a rasher round each leek like a ribbon. Cover as much of the leek as possible and secure the rasher at each end with a half toothpick.

Melt the butter in a heavy-base frying pan. Put in the leeks, brown quickly on all sides, and season. Pour in some water; if the pan is small, use enough water to cover the leeks, if it is large, the water should come half way up the leeks.

Cover, and simmer until the water has almost gone in about 20 to 30 minutes, when the leeks should be cooked.

Serve with scrambled eggs and pour over them any sauce which may be left in the frying pan.

Salmon and Potato Pie

1 8 oz tin and 1 4 oz tin of pink salmon
3 eggs
2 cups of mashed potato (hot)
1 oz of butter
1½ cups of white sauce made from:
3 tablespoons of butter
3 tablespoons of flour
¾ teaspoon of salt
1⅓ cups of a mixture of milk and salmon liquid

(6 servings)

Peel the potatoes, cook them in boiling salted water, and mash with a little milk and butter.

Drain the salmon and flake it coarsely. Make the sauce and mix with the salmon. Beat the eggs well and fold them into the salmon mixture.

Turn into a buttered ovenproof dish and bake for 45 to 60 minutes at 350 degrees F when it should be set. Quickly cover with the hot mashed potato, mark with a fork, and dot with butter. Brown the top in a hot oven.

Ideas for Your Electric Blender

By PATRICIA M. de LAUTOUR,
Home Science Instructor, Department of Agriculture, Palmerston North

AN exceedingly useful gadget for the housewife is the electric blender, frequently referred to as a liquidiser. Blenders can be bought separately under different trade names or as an extra attachment for many of the electric mixers.

DEPENDING on the make, they will liquefy fruits and vegetables and grind nut meats, raisins, lentils, and meat. They are also very useful for making a cream sauce or a puree. Most children love the delicious and nutritive milk shakes that are prepared so easily. While they can also be used to blend very rapidly the ingredients for batters such as pancakes or Yorkshire pudding, the usual method is more satisfactory. One of the few things the blender will not do satisfactorily is to whip egg whites.

Care Needed in Use

Because they are such useful gadgets, treat them with some consideration and do not expect too much from them. Chop harder or coarser foods such as meat before putting them into the blender. Always cool boiling hot liquids before putting them into the blender and never have the container more than two-thirds full. To prevent splashing always place the lid on the container before starting the blender. The messiest mixture can be cleaned off quite easily by putting some soap flakes and water into the container and running the blender for a few seconds.

If raw meat is used, it will sometimes form curds during the cooking process, but these can be removed easily by further blending. Raw foods such as rhubarb, pineapple, and celery may be tough and stringy and should be softened first by cooking, or the tough parts can be removed by straining. Onion, too, must be used cautiously, as raw onion is very strong in flavour. The flavour can be improved by cooking.

A very great variety of soups, purees, and fruit or vegetable drinks can be made, so the housewife should experiment with both fresh foods and leftovers. Here are a few suggestions:

Blender Cream Soups

2 cups of milk or part cream or stock
2 tablespoons of flour
2 tablespoons of soft butter
½ teaspoon of salt
1/6 teaspoon of pepper
1 thin slice of onion
2 or 3 sprigs of parsley, or ¼ cup of celery leaves
Raw, tinned, frozen, or cooked vegetables cut up coarsely, for example, ⅔ cup of asparagus
or 1 cup of corn
or 2 cups of raw cucumber
or 1 cup of peas (use only 1 tablespoon of flour)

Place the ingredients in the container, and cover and blend until smooth. Remove from the blender, stir, and cook over low heat until the soup boils for about five minutes. Season further if necessary. If using cooked, leftover food, do not season the soup until ready to serve it.

Blended Pureed Vegetables

These are particularly useful for mothers with young children.

Raw vegetables may be blended and then cooked until they boil. If preferred, they may be just barely cooked, preferably in a pressure cooker, cooled, and then blended. Butter and cream may be added.

Cold Fruit Drinks

Almost any fruit or mixture of fruits can be used unless the fruit is very seedy or has long, tough fibres, such as those of pineapple.

Interesting flavours can be produced by adding small quantities of jam or jelly; honey can be tried as a change for sweetening.

For a frothy, thick texture add a raw apple, cooked rhubarb, or cracked ice cubes.

For a smooth, heavy result add egg yolk or cream.

For a creamy result use fresh peach, banana, or tinned pineapple juice.

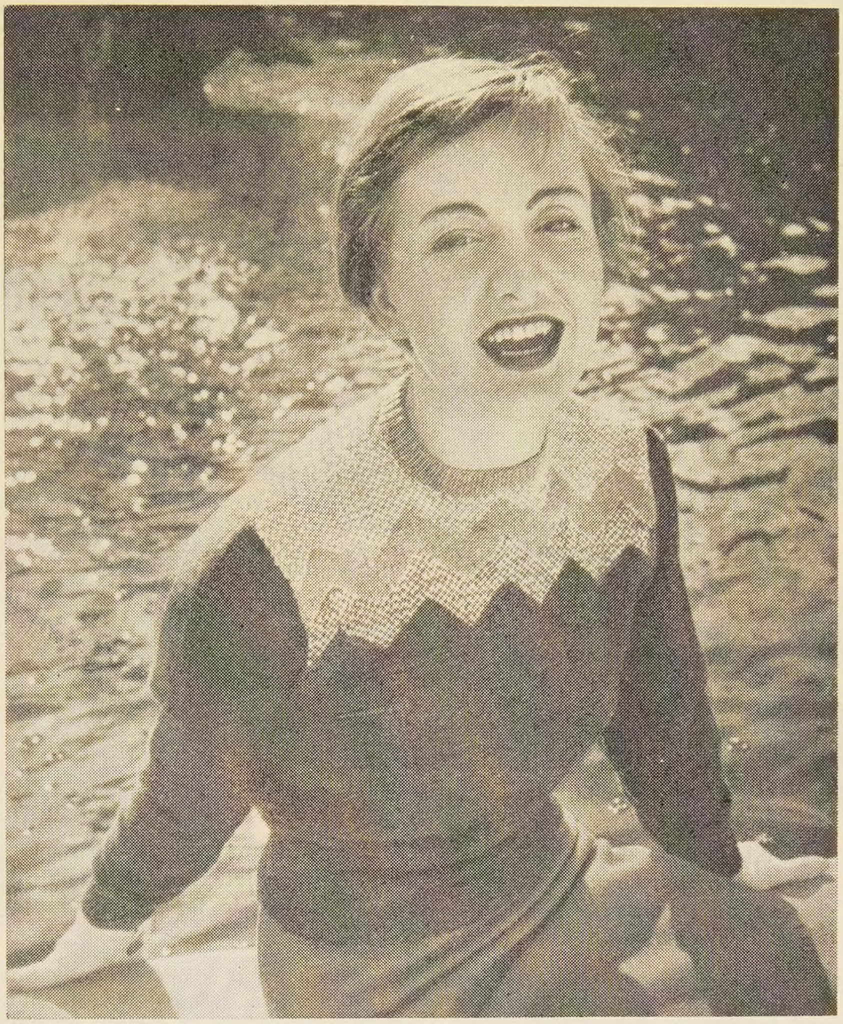
For a velvety drink blend one banana with one cup of milk, adding a little vanilla if liked. This can be very tastefully varied by the addition of 1 tablespoon of chocolate syrup or 4 tablespoons of vanilla ice cream.

Blender Health Drink

1 peeled and sectioned navel orange
2 tablespoons of lemon juice
1 cup of finely chipped ice
1 egg yolk
1 tablespoon of sugar or honey

Place in the blender and run until thoroughly blended.

A Multi-coloured Yoked Jersey



A WARM, long-sleeved jersey is a necessary article in every woman's winter wardrobe. The jersey, illustrated at right, features a novel multi-coloured yoke that will add colour to any winter outfit. Directions for knitting it are given below.

ABBREVIATIONS: K., knit; p., purl; st., stitch(es); rep., repeat; beg., beginning; cont., continue; dec., decrease; inc., increase; tog., together; st. st., stocking stitch (1 row k., 1 row p.); in., inch(es); dk. gr., dark grey; lt. gr., light grey; wt., white; patt., pattern; g. st., garter stitch (every row k.); ch., chain; d. c., double crochet.

Materials: 7oz. 3-ply wool (dark grey); 1oz. 3-ply wool (light grey); 1oz. 3-ply wool (white); 1 pair No. 10 and 1 pair No. 12 knitting needles; crochet hook; 4 buttons.

Measurements: Length 19in.; bust 35in.; sleeve seam 18in.

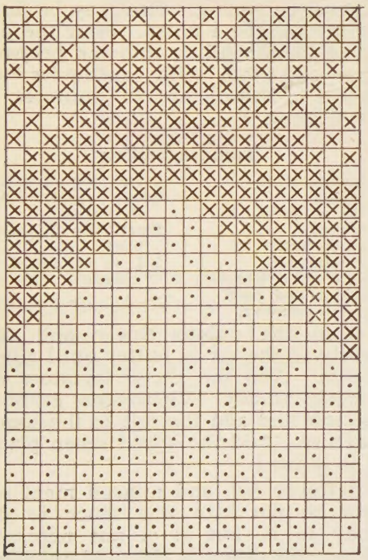
Tension: 7½ st. to 1in.

The Front

Using No. 12 needles and dk. gr. wool cast on 110 st. and work 3in. in k. 1, p. 1 rib. Change to No. 10 needles and cont. in st. st. inc. 1 st. both ends of the 5th row and of every following 6th row until there are 132 st. on needle. Cont. without shaping until work measures 11in., ending with a p. row.

To Shape Armholes

Cast off 6 st. at beg. of next 2 rows, then dec. 1 st. both ends of every row until 100 st. remain. Cont. without shaping until work measures 14in., ending with a p. row.



• Dark grey

X Light grey

☐ White

To Work Yoke

Join in wt. wool and work from diagram as follows:—

1st row: * K. 1 wt., 19 dk. gr. Rep. from * to end.

2nd row: * P. 1 wt., 17 dk. gr., 1 wt., 1 dk. gr. Rep. from * to end.

Cont. in this way, rep. rows 3 to 11 inclusive from the diagram.

12th row: Join in lt. gr. wool, * p. (1 wt., 1 dk. gr.) 9 times, 1 wt., 1 lt. gr. Rep. from * to end.

13th row: * K. 2 lt. gr., (1 wt., 1 dk. gr.) 8 times, 1 wt., 1 lt. gr. Rep. from * to end.

Now rep. rows 14 to 21 inclusive from the diagram once.

22nd row: * P. 19 lt. gr., 1 wt. Rep. from * to end.

23rd row: * K. 1 lt. gr., 1 wt., 17 lt. gr., 1 wt. Rep. from * to end.

Now rep. rows 24 to 30 inclusive from the diagram once.

31st row: * K. 1 lt. gr., 1 wt. Rep. from * to end.

32nd row: * P. 1 lt. gr., 1 wt. Rep. from * to end.

To Shape Neck

Work in patt. of alternated lt. gr. and wt. as in last 2 rows, shaping as follows:—

Next row: Patt. 40, cast off 20, patt. to end.

Cont. in patt. on last 40 st., dec. 1 st. at neck edge on every row until 34 st. remain, then proceed without shaping until work measures 19in., ending at armhole edge.

To Shape Shoulders

Next row: Cast off 9, patt. to end.

Next row: Patt. to end.

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Rep. last 2 rows twice. Cast off remaining st. Rejoin lt. gr. and wt. wools to needle and work as for first side.

The Back

Work as given for front to end of the 10th patt. row as worked from the diagram (100 st.). Cont. in patt. and divide for back opening thus:—

Next row: Work as for 11th row of diagram on 50 st., turn. (2½ reps. of patt.)

Next row: As 12th patt. row of diagram. (Begin with ½ rep. of patt.).

Cont. in patt. on these 50 st. only until the 30th patt. row of diagram is completed, then proceed as for 31st and 32nd patt. rows (that is, alternated lt. gr. and wt.) until work measures 18½in., ending at opening edge.

To Shape Neck

Cast off 12 st. at beg. of next row, then dec. 1 st. at this same edge on every row until 34 st. remain. Finish at armhole edge.

To Shape Shoulder

Next row: Cast off 9, patt. to end.

Next row: Patt. to end.

Rep. last 2 rows twice. Cast off remaining st. Rejoin dk. gr. wool to second set of 50 st. at opening edge and cast on 4 st. for under-wrap. K. these 4st. in dk. gr., then work as 11th patt. row of diagram to end of row, beg. with ½ rep. of patt.

Next row: Work as 12th row of diagram to last 4 st., k. 4 dk. gr. Cont. in this way working in patt. and keeping the 4 under-wrap st. in dk. gr. g. st. until work measures 18½in., ending at opening edge.

To Shape Neck

Cast off 16 st. at beg. of next row, then dec. 1 st. at neck edge on every row until 34 st. remain. Finish at armhole edge. Shape shoulder as for first side.

Neck Border

Join shoulder seams. With right side of work facing and using No. 12 needles and lt. gr. wool k. up 100 st. evenly round neck edge. Work ¾in. in k. 1, p. 1 rib. Cast off loosely in rib.

Sleeves

Using No. 12 needles and dk. gr. wool, cast on 58 st. and work 2in. in k. 1, p. 1 rib. Change to No. 10 needles and cont. in st. st., inc. 1 st. both ends of next row and of every following 8th row until there are 96 st. Cont. without shaping until work measures 18in., ending with a p. row.

To Shape Top

Dec. 1 st. both ends of every alternate row until 60 st. remain, then dec. both ends of every row until 40 st. remain. Cast off 3 st. at beg. of next 8 rows. Cast off remaining st.

To Make up

Press work lightly on wrong side using a hot iron over a damp cloth. Join side and sleeve seams.

Stitch sleeves into armholes. Sew down cast-on edge of under-wrap. Work a row of d.c. down top edge of opening, then make 4 small ch. button loops at regular intervals, with the top one at neck edge. Sew on buttons to match loops. Press seams.

☆

Pizza Pie for Supper

By DAPHNE EILERS,

Home Science Instructor, Department of Agriculture, Dunedin

ITALIAN pizza pie is a savoury dish that is easily made and should find favour with most people who enjoy the combination of tomato, onion, and cheese. The filling is similar in flavour to the sauce served with Italian-style spaghetti.

THE true pizza has a yeast-bread base made from the same mixture used for bread rolls, which gives a delicious crisp brown crust. When brought straight from the oven with the tomato-cheese filling sizzling hot this pie makes good eating served with a tossed salad and plenty of hot coffee.

However, if the thought of working with yeast is a little daunting, a scone dough will make a satisfactory substitute. Recipes for both mixtures are given below.

Pizza pie may be made in advance and reheated just before serving.

Yeast-bread Crust

⅓ oz of yeast (⅓ tablespoon dried yeast)
2 teaspoons of sugar
½ teaspoon of salt
2-3 cups of flour
⅔ cup of milk or water (previously boiled and cooled until lukewarm)
1 tablespoon of butter (melted)

Cream the yeast and sugar together; add the **lukewarm** milk or water, melted butter, and salt. Add sufficient flour to make a soft dough. When just stiff enough to handle turn the dough out on to a lightly floured board and knead it until it is smooth and satiny. Leave it in a greased covered bowl in a warm place to double in bulk. The hot water cupboard is an ideal place, but if it is more convenient, stand the bowl of dough in a larger bowl containing warm, not hot, water.

When ready punch the dough down and then knead it gently to distribute the gas bubbles. Place the ball of dough on a greased oven tray and press it out into a 10 in. circle about ½ in. thick.

Again leave it to rise in a warm place until it has become about 1 in. thick. With the knuckles press down from the centre of the circle outward, leaving a ring round the outside circumference to serve as an edging to the pie. Pour in the prepared tomato mixture, place anchovy fillets on top, and sprinkle all liberally with grated cheddar cheese. The dough edges may be brushed with egg yolk if desired to give a shiny finish. Bake the pie at 400 degrees F for 10 minutes and then reduce the heat to 350 degrees F for a further 25 to 30 minutes.

Scone Crust

8 oz of flour
4 level teaspoons of baking powder
½ teaspoon of salt
½ oz of butter
⅔ cup of milk

Sift the dry ingredients together and cut or rub in the butter. Add enough milk to make a soft dough. Knead lightly on a floured board. Keep back about a quarter of the dough. Shape the remainder on a greased tray by patting it to form a circle of dough about ½ in. thick. Roll out the rest of the dough and cut it into strips. Moisten the top edges of the circle and place the strips of dough on top to form an edging. This may be fluted a little to give a finish. Pour the prepared tomato filling into the prepared case and top with anchovies and cheese. Bake for 20 minutes at 400 degrees F.

Tomato Filling

2 medium-sized onions
Clove of garlic, if desired
1 oz of butter or cooking oil
1 lb of ripe tomatoes (skins and hard cores removed)
½ teaspoon of salt
Green pepper (sliced), if desired
Small tin of anchovy fillets
2-4 oz of grated cheese

Slice the onions finely and cook gently in the oil or butter until golden brown. Add the sliced tomatoes and simmer slowly. Crush the garlic in the salt and add the salt to the tomato mixture. Add the sliced green pepper if it is used.

Leftover fish and minced meat may also be put into this sauce to give body to it, but it is not necessary. When the puree is soft and thickened pour it into the prepared case and top with anchovies and grated cheese as described for the two types of crust.

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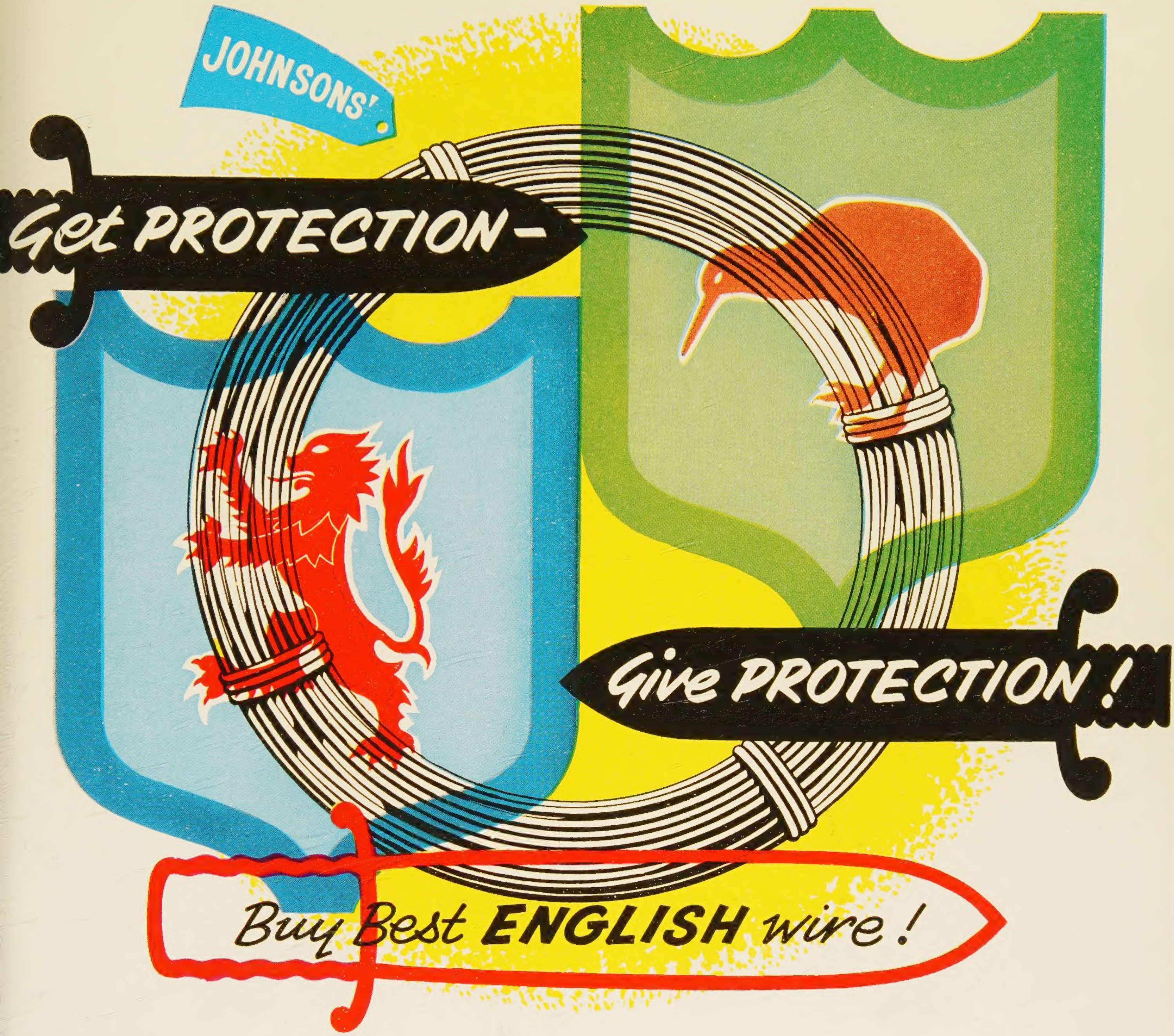
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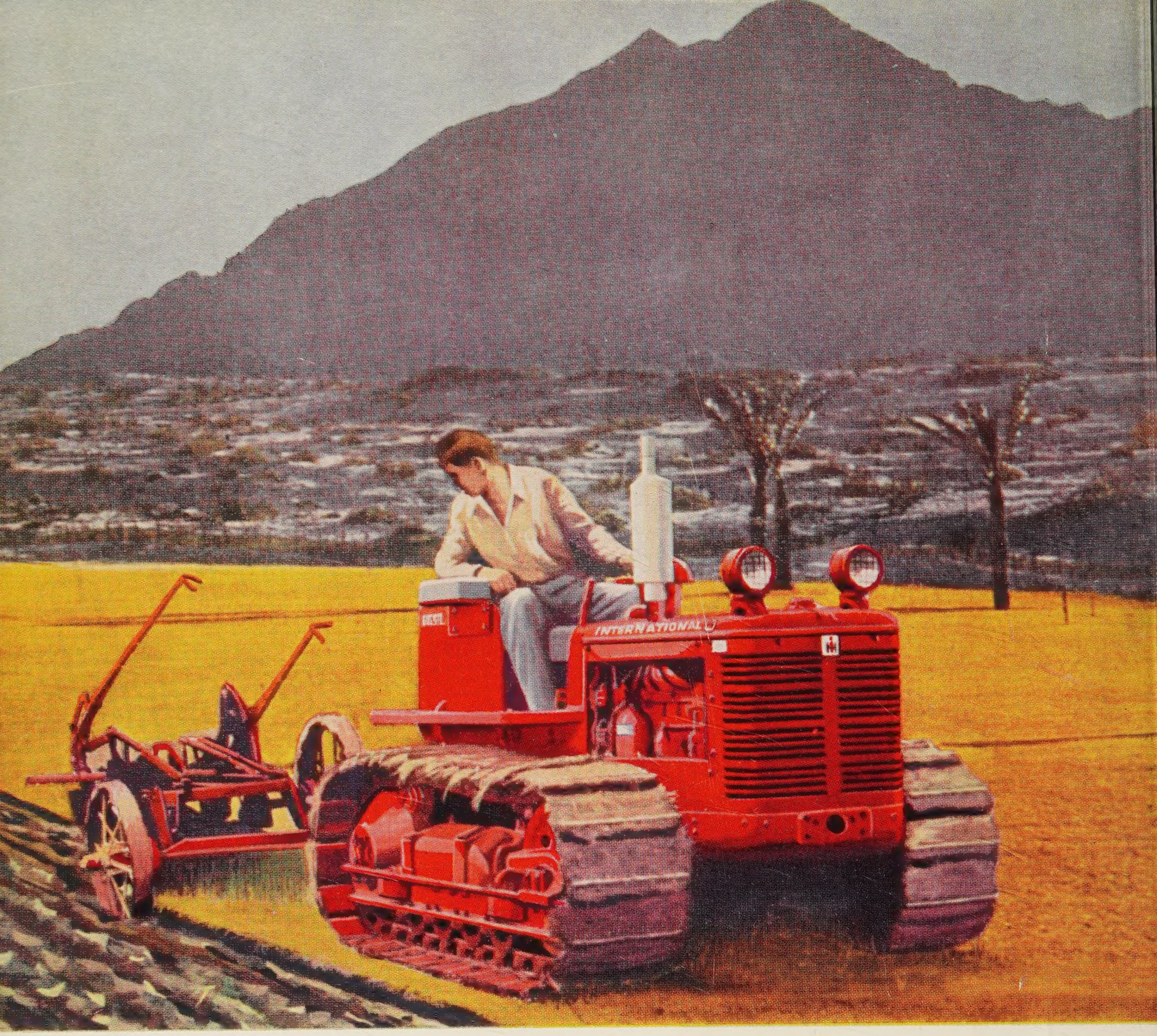

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